Premium and Atrium
Using Unity Pro
Ethernet Network Modules
User Manual

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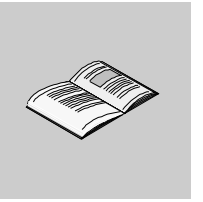

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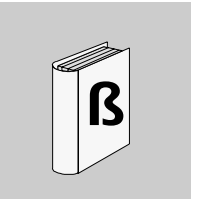
Safety Information



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NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

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WARNING indicates a potentially hazardous situation, which, if not avoided, **can result** in death, serious injury, or equipment damage.

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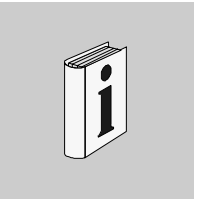
About the Book



At a Glance

Document Scope

This manual describes the implementation of an Ethernet network on Premium and Atrium PLCs using Unity Pro Version 2.0 or later software.

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Title of Documentation	Reference Number
Communication architectures and services	Included in the documentation CD-ROM

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Introduction to Ethernet Communication

I

At a Glance

This part describes Ethernet communication.

What's in this Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
1	Communication via Ethernet Network	15

Communication via Ethernet Network

1

Introduction

This chapter introduces communication via Ethernet network and its facilities.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
General	16
Details of Available Services	18
Overview	19

General

Introduction

Ethernet network communication is available for Premium PLCs using:
- TSX ETY 110 and TSX ETY 110 WS modules,
- the TSX ETY 210 module,
- the modules TSX ETY 4103, TSX ETY PORT and TSX ETY5103,
- the Ethernet link of the TSX P57 5634 coprocessor.

They have several types of interface.

TSX ETY 110

Connection can be made:
- to an ETHWAY profile network supporting the following utilities:
  - common words,
  - UNI-TE messaging,
- to a TCP/IP profile network supporting the following utilities:
  - UNI-TE and Modbus messaging,
  - SNMP management.

TSX ETY 110 WS

Connection can be made:
- to an ETHWAY profile network supporting the following utilities:
  - common words,
  - UNI-TE messaging,
- to a TCP/IP profile network supporting the following utilities:
  - UNI-TE and Modbus messaging,
  - SNMP management.
  - with TCP direct access,
  - access to the web-user pages HTTP server.

TSX ETY 210

Connection can be made:
- to an ETHWAY profile network supporting the following utilities:
  - common words,
  - UNI-TE messaging.
- to a TCP/IP profile network supporting the following utilities:
  - UNI-TE and Modbus messaging,
  - SNMP management,
  - specific to redundancy.

TSX ETY 4103/ PORT and TSX P57 5634/4634

They allow connection:

- to a TCP/IP profile network supporting the following utilities:
  - UNI-TE and Modbus messaging,
  - SNMP management,
  - electronic mail notification service (SMTP).
  - input/output management (I/O Scanner),
  - IP address management (BOOTP/DHCP),
  - access to the built-in web server,
  - common data exchange between stations (Global Data),
  - diagnostics from Web pages.

TSX ETY 5103

Connection can be made:

- to a TCP/IP profile network, which is necessary when using FactoryCast and which supports the following utilities:
  - UNI-TE and Modbus messaging,
  - SNMP management,
  - electronic mail notification service (SMTP).
  - time synchronization service (NTP)
  - input/output management (I/O Scanner),
  - IP address management (BOOTP/DHCP),
  - access to the built-in web server,
  - common data exchange between stations (Global Data),
  - diagnostics from Web pages,
  - access to the web-user pages HTTP server,
  - TCP direct access.

TSX WMY 100

They allow connection:

- to a TCP/IP profile network supporting the following utilities:
  - UNI-TE and Modbus messaging,
  - SNMP management,
  - access to the built-in web server,
  - diagnostics from Web pages.

Details of Available Services

Introduction Depending on the type of Ethernet module selected, certain functions will or will not be accessible.

Selection Guide The summary table below shows the various selections possible:

Service	**TSX ETY 110**	**TSX ETY 110 WS**	**TSX ETY 210**	**TSX ETY 4103 / TSX ETY PORT**	**TSX ETY 5103**	**TSX P57 5634/4634**
Connection at 10 Mbits/s	Half/Full Duplex	Half/Full Duplex	Half/Full Duplex	Half/Full Duplex	Half/Full Duplex	Half/Full Duplex
Connection at 100 Mbits/s	-	-	-	Half/Full Duplex	Half/Full Duplex	Half/Full Duplex
TCP/IP utility	X	X	X	X	X	X
SNMP utility:						
Standard MIB	X	X	X	X	X	X
MIB Ethernet Transparent Factory	-	-	-	X	X	X
IO Scanner Utility	-	-	-	X (1)	X	X
Address Server utility (BOOT/ DHCP)	-	-	-	X (1)	X	X
UNI-TE messaging	X	X	X	X	X	X
Modbus Messaging	X	X	X	X	X	X
ETHWAY profile	X	X	X	-	-	-
Software loading via FTP (firmware)	X	X	X	X	X	X
Installed HTTP server	-	-	-	X	X	X
Global Data	-	-	-	X (1)	X	X
Diagnostics from Web pages	-	-	-	X	X	X
User WEB pages HTTP server	-	X	-	-	X	-
Redundancy	-	-	X	-	-	-
TCP direct access	-	X	-	-	X	-
Electronic mail notification service	-	-	-	X	X	X
Time synchronization service	-	-	-	-	X	-
Legend						
X	Available					
-	Not available					

Overview

Introduction

The software installation of the application-specific modules is carried out from the various Unity Pro editors:

- in offline mode,
- in online mode.

If you do not have a processor to connect to, Unity Pro allows you to carry out an initial test using the simulator. In this case the installation (see ***p. 20***) is different.

The following order of installation phases is recommended but it is possible to change the order of certain phases (for example, starting with the configuration phase).

Installation Phases with Processor

The following table shows the various phases of installation with the processor.

Phase	Description	Mode
Declaration of variables	Declaration of IODDT-type variables for the application-specific modules and variables of the project.	Offline (1)
Programming	Project programming.	Offline (1)
Configuration	Declaration of modules.	Offline
	Module channel configuration.	
	Entry of configuration parameters.	
Association	Association of IODDTs with the channels configured (variable editor).	Offline (1)
Generation	Project generation (analysis and editing of links).	Offline
Transfer	Transfer project to PLC.	Online
Adjustment/ Debugging	Project debugging from debug screens, animation tables.	Online
	Modifying the program and adjustment parameters.	
Documentation	Building documentation file and printing miscellaneous information relating to the project.	Online (1)
Operation/ Diagnostic	Displaying miscellaneous information necessary for supervisory control of the project.	Online
	Diagnostic of project and modules.	
Key:		
(1)	These various phases can also be performed in the other mode.	

Implementation Phases with Simulator

Note: the simulator is only used for the discrete or analog modules.

The following table shows the various phases of installation with the simulator.

Phase	Description	Mode
Declaration of variables	Declaration of IODDT-type variables for the application-specific modules and variables of the project.	Offline (1)
Programming	Project programming.	Offline (1)
Configuration	Declaration of modules.	Offline
	Module channel configuration.	
	Entry of configuration parameters.	
Association	Association of IODDTs with the modules configured (variable editor).	Offline (1)
Generation	Project generation (analysis and editing of links).	Offline
Transfer	Transfer project to simulator.	Online
Simulation	Program simulation without inputs/outputs.	Online
Adjustment/ Debugging	Project debugging from debug screens, animation tables.	Online
	Modifying the program and adjustment parameters.	
Key:		
(1)	These various phases can also be performed in the other mode.	

Ethernet Communication Hardware installation

II

At a Glance

This part describes Ethernet communication hardware installation for Premium and Atrium PLCs.

What's in this Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
2	Communication: TSX ETY 110 Module	23
3	Communication: 10/100 MBits/s	39

Communication: TSX ETY 110 Module

2

At a Glance

This chapter deals with installing the Ethernet network module **TSX ETY 110**, in a Premium/Atrium PLC.

What's in this Chapter?

This chapter contains the following sections:

Section	Topic	Page
2.1	At a Glance	24
2.2	Description	25
2.3	Characteristics of the Ethernet Channel	26
2.4	Installing the TSX ETY 110 Module	27
2.5	Connection via the AUI interface	31
2.6	10baseT Interface	34
2.7	Display Panel, Diagnostics	36
2.8	Electrical Features	37

2.1 At a Glance

At a Glance

General

Communication module **TSX ETY 110** is used to communicate in an Ethernet architecture. It is made up of a communication channel which offers two types of connections:

- Connection to an ETHWAY network supporting common words and X-Way UNI-TE message-handling services on an ETHWAY profile.
- Connection to a TCP-IP network supporting the X-Way UNI-TE message-handling service.

This module also ensures transparent routing of X-Way UNI-TE messages from a TCP-IP network to an X-Way network, and vice versa.

Please refer to the Ethernet reference manual for wiring an ETHWAY architecture.

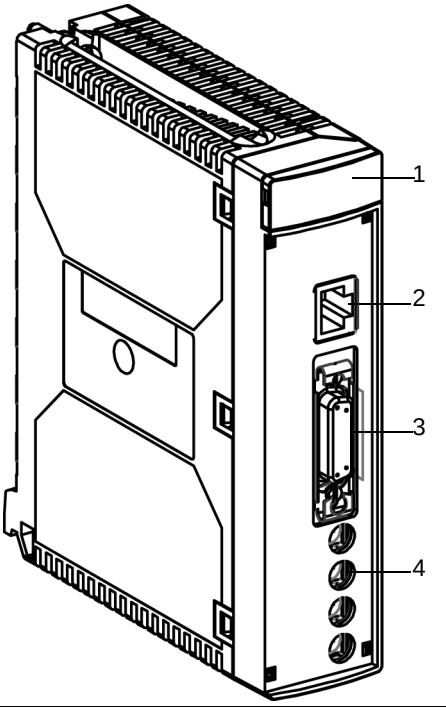
2.2 Description

Description

General

Module **TSX ETY 110** is a single (half size) module which is inserted in a rack slot of a Premium PLC station.

Description:

1. Display panel indicating state of module. **2.** Standard connector for 10baseT (RJ45) interface. **3.** Standard connector for 10base5 (AUI) interface. **4.** Thumbwheel to define station number and network number.	Illustration: 

2.3 Characteristics of the Ethernet Channel

Characteristics of Ethernet Channel

General

The module is made up of two standard interfaces for connecting to a network:

- One 10baseT interface on front panel of the module, comprising an RJ45 connector, which is used for a point to point link via a linking cable made up of two twisted pairs of impedance 100 Ω ± 15 Ω.
- A 10base5 or AUI interface on front panel of module comprising a SUB-D 15-pin connector, used to link to network by branching. This interface is also used to supply active connection devices (Taps). It complies with the IEC 802 3 standard and is used to connect any device which complies with this standard.

The type of connection is recognized automatically as soon as connection is made to the network.

Services and operations supported by the module:

TCP-IP services	UNI-TE	● Client/server mode. ● Synchronous requests of 256 bytes. ● Asynchronous requests of 1 Kbyte.
Ethway services	UNI-TE	● Client/server mode. ● Synchronous requests of 256 bytes. ● Asynchronous requests of 1 Kbyte.
	Common words	● Shared database of 256 words
	Application to application	● Message exchange in point to point 256 bytes max.
Common services		● X-Way inter-network routing ● X-Way /UNI-TE routing ● Module diagnostics

Note: The Ethernet driver supports the Ethernet II and (LCC+SNAP) 802.3 formats on TCP-IP and LCC 802.3 on Ethway.

2.4 Installing the TSX ETY 110 module

At a Glance

This section deals with installing module **TSX ETY 110** in a PLC.

What's in this Section?

This section contains the following topics:

Topic	Page
Selecting the Type of Processor	28
Wiring/Unwiring with Power Switched On	29
Station Address Coding	30

General

The communication module **TSX ETY 110** is mounted in the rack slot of a Premium/ Atrium PLC station. It can be installed in any available slot (except in the offset X Bus racks), on condition that the supply constraints of the rack are observed (see ***Electrical characteristics, p. 37***).

Selecting the Type of Processor

Selection Guide

Selecting the processor to control the PLC station will depend on the number of network connections required.

Processors	Number of network connections	Number of ETY 4103/5103 per station (*)
TSX P57 104 (1)	1	1
TSX P57 154 (1)	1	1
TSX P57 204	1	1
TSX PCI 57 204	1	1
TSX P57 254 (1)	1	1
TSX P57 2634	1	0
TSX P57 2834 (1)	1 2 (**)	0
TSX P57 304	3	3
TSX P57 354 (1)	3	3
TSX P57 3634	3	2
TSX P57 454	4	4
TSX PCI 57 454 (1)	4	4
TSX P57 4834 (1)	4	3
TSX P57 554 (1)	4	4
TSX P57 5634	4	3
TSX P57 4634	4	3
(*) Compatible with 5V power supply (**) Supports two network connections if the PLC is used in Warm Standby (1) Available for Unity Pro V2.0 or higher		

Wiring/Unwiring with Power Switched On

The Module

Module **TSX ETY 110** can be wired or unwired with power switched on without disrupting the operation of the station.
The module does not have a RAM internal backup memory function: this will be erased when power is switched off.
The module initializes itself when power is switched on. A communication break can be expected during this intervention.

The Link

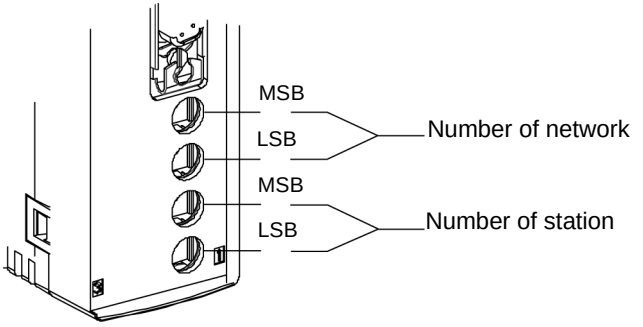
The SUB-D 15-pin connectors of the AUI interface and the RJ45 connector of the 10baseT interface can be connected or disconnected when power is on. A communication break can therefore be expected in the application in progress.

Station Address Coding

General

Four thumbwheels, which can be accessed from the front panel, are used to encode the network number and the station number.

Illustration:



LSB = least significant bit
MSB = most significant bit

Values of coding possible in hexadecimal:

Network number	Station number
0 to 7F	0 to 3F

Example of coding:
Network 3: 16#03
Station 27: 16#1B

The thumbwheels are to be adjusted as follows:

0	PF
3	Pf
1	PF
B	Pf

Note: Caution: in an Ethernet network, there must only be one MAC address for each station. Before modifying these addresses you must check that they comply with the addressing plan of the carrier.

2.5 Connection via the AUI interface

Connection by AUI Interface

General

This interface is used to connect all types of devices which comply with the physical layer defined in the OSI 802.3 standard (10base5, 10base2, FOIRL, etc.) through a transceiver.

Module **TSX ETY 110** can provide a remote power supply for the transceiver through the Sub-D connector with the following characteristics:

- Imax = 0.5 mA
- 12 V-6%<Usupply<15 V+15%

The module is connected to the main cable via a transceiver and by the following branch cables:

- **TSX ETY CB 005** - Length 5 m
- **TSX ETY CB 010** - Length 10 m
- **TSX ETY CB 020** - Length 20 m

The maximum length of a branch may be 50 m. This length can be achieved by connecting several branch cables end to end.

Note: It is essential to use transceivers (TSX ETH ACC2) to connect two modules in point to point.

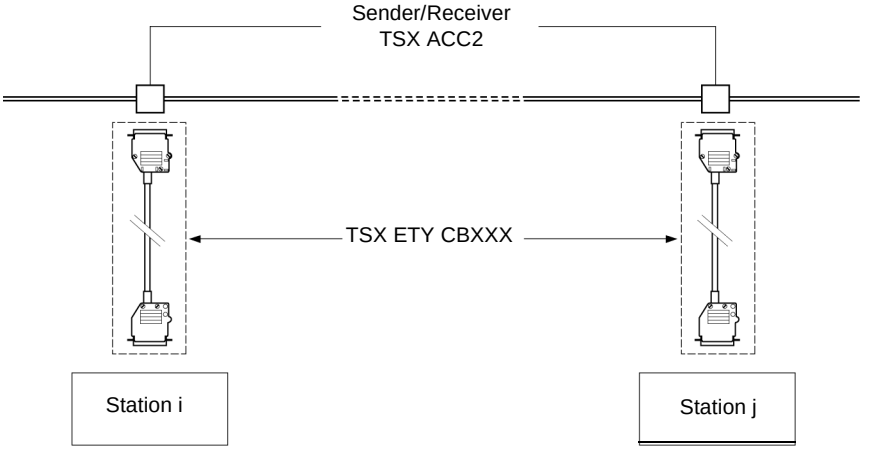
Connector Pinouts

Sub-D 15 pins according to the OSI 802.3 standard:

Pin number	Designation according to ISO 802.3	Use
1	CI-S (Control In Shield)	GND
2	CI-A (Control In A)	COLL+
3	DO-A (Data Out A)	TD+
4	DI-S (Data In Shield)	GND
5	DI-A (Data in A)	RD+
6	VC (Voltage Common)	GND
7	not used	
8	not used	
9	CI-B (Control In B)	COLL-
10	DO-B (Data Out B)	TD-
11	DO-S (Data Out Shield)	GND
12	DI-B (Date In B)	RD-
13	VP (Voltage Plus)	12 V
14	VS (Voltage Shield)	GND
15	not used	
Sub-D connector body	PG (Protective Ground)	Protective ground

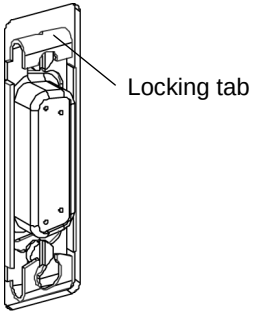
Topology

Illustration:



Locking

The Sub-D connector is equipped with a sliding lock system The connector is locked by sliding the tab to the bottom. To ensure the module works properly in a disturbed environment it is **essential** to carry out the locking procedure.
Illustration:



2.6 10baseT Interface

10baseT Interface

General

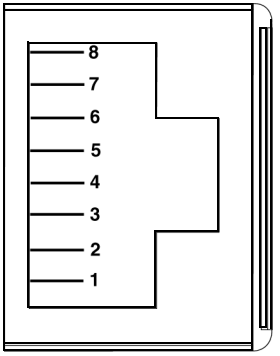
This interface has a standard type RJ45 connector. These connection cables are widely used in business.
In an industrial environment, you must use a cable with the following characteristics:

- Shielded twisted double pair
- Impedance 100 Ω±15 Ω (from 1 to 16 MHz)
- Maximum attenuation 11.5 dB/100 meters
- Maximum length 100 meters

The 10baseT connection is a point to point connection to form a star-shaped network. The stations are connected to concentrators or switches.

Pinouts

Illustration:

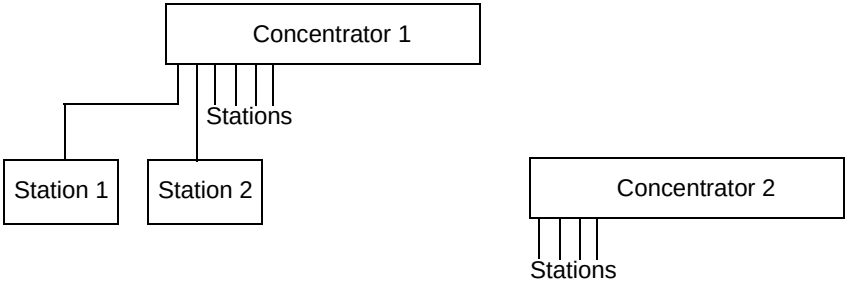


Reminder of pinouts:

Pin	Signal
1	TD+
2	TD-
3	RD+
4	not connected
5	not connected
6	RD-
7	not connected
8	not connected

Topology

This link is used to create a star-shaped network with connections in point to point. The stations are connected to a concentrator (Hub). The concentrators can also be connected in cascade to increase network size.
Illustration:

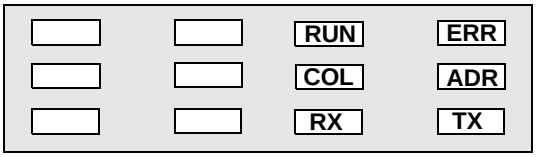


2.7 Display Panel, Diagnostics

Display Panel, Diagnostics

General

The display panel complies with the Premium standard



Diagnostics

Meaning of the diagnostics LEDs:

RUN	ERR	COL	ADR	TX	RX	Meaning
O	P	ns	ns	ns	ns	Module not operational.
O	F	O	O	O	O	Module not configured or configuration error.
F	F	O	O	O	O	Module running self-test.
P	O	O	O	F	O	Ethernet communication sending.
P	O	O	O	O	F	Ethernet communication receiving.
P	O	O	O	F	F	Ethernet communication in sending/receiving.
P	O	F	O	F	O	Module has detected collision.
P	O	O	P	O	O	Duplicate MAC address.
O	O	O	P	O	O	Network address beyond limits.
P = Permanently on, F = flashing, O = Off, ns = not significant						

2.8 Electrical Features

Electrical Characteristics

General

Module **TSX ETY 110** can be inserted in any rack slot of a Premium/Atrium station (except in an X Bus offset rack). The module consumption from the supply depends on the selection made from the transceiver remote power supply option.

Table of consumption:

Voltage	**Current consumed**		**Dissipated power**	
5 volts	Typical	Maximum	Typical	Maximum
with remote power supply (RJ45)	0.8 A	1.2 A	4 W	6 W
with remote power supply (AUI)	1.2 A	2.5 A	6 W	12.5 W

Note: Caution: Modules **TSX ETY 110** on 5 volts have high consumption when the AUI connection is used. Special attention should therefore be given what sort of devices are in the rack before deciding which kind of supply to choose.

Number of **TSX ETY 110** modules which can be connected to a rack:
- 2 modules with AUI connection.
- 4 modules with RJ45 connection.

Communication: 10/100 MBits/s

3

Introduction

This chapter deals with hardware installation of the 10/100 MB/s Ethernet communication module via the **TSX ETY 4103/PORT, TSX WMY 100** and **TSX ETY 5103** modules, as well as the Ethernet 10/100 MB/s communication module integrated into the **TSX P57 5634** processors.

What's in this Chapter?

This chapter contains the following sections:

Section	Topic	Page
3.1	Introduction	40
3.2	Description	41
3.3	Ethernet Channel Characteristics	45
3.4	Installation of TSX ETY 4103/PORT/5103 Modules and the TSX P57 5634 Processor	46
3.5	10/100baseT Interface	49
3.6	Display, Diagnostics	51
3.7	Electrical Characteristics	54
3.8	Standards	55
3.9	Operating Conditions	56

3.1 Introduction

Introduction

General

The **TSX ETY 4103/PORT/5103** and **TSX WMY 100** communication modules, as well as the Ethernet channel integrated into the **TSX P57 5634/4634** processor, allow Premium PLCs to be integrated into an Ethernet communication architecture. The principal characteristics of the proposed Ethernet connections are the following:

- Connection to a TCP/IP network.
- Communication in Half and Full Duplex mode by automatic recognition.
- Transmission speed from 10 or 100 Mbits/s by automatic recognition.
- Connection to network by copper cable via an RJ45 connector.

These modules are used to carry out the following functions:

- IO Scanner Service (excepting TSX WMY 100).
- Global Data (excepting TSX WMY 100).
- Web server.
- Address Server (excepting TSX WMY 100).
- X-Way UNI-TE and Modbus messaging service on TCP/IP.
- SNMP Service.
- Electronic mail notification service (SMTP).
- Time synchronization service (NTP).

Note: The TSX WMY 100 module behaves like the TSX ETY 4103 module, except for the IO Scanning, Global Data, Address Server, and electronic mail notification utilities, which the TSX WMY 100 does not manage. For all other information concerning the TSX WMY 100 module, consult the relevant sections and chapters of TSX ETY 4103.

3.2 Description

Introduction

This section deals with the physical description of the **TSX ETY 4103/PORT, TSX WMY 100** and **TSX ETY 5103** modules and the Ethernet solution of the **TSX P57 5634** processor.

What's in this Section?

This section contains the following topics:

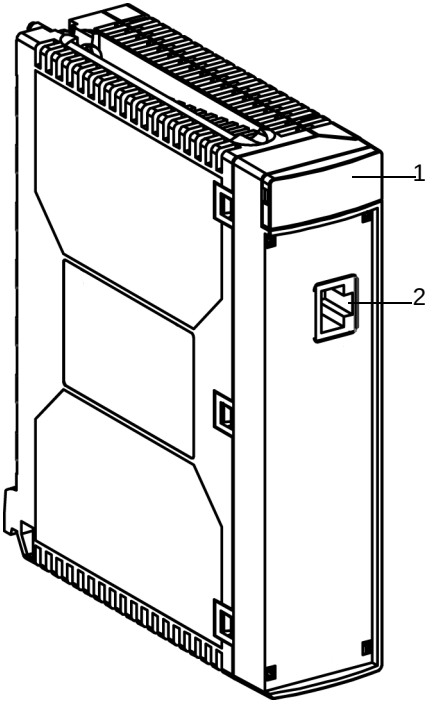
Topic	Page
Description	42
Physical Description of the TSX P57 5634 Processors	43

Description

General

Modules **TSX ETY 4103/5103** are single format modules which are inserted in a slot on the main or extension rack of a Premium PLC station. The **TSX ETY PORT** solution is a **TSX ETY 4103** module built into the processor and has the same characteristics as the **TSX ETY 4103** module.

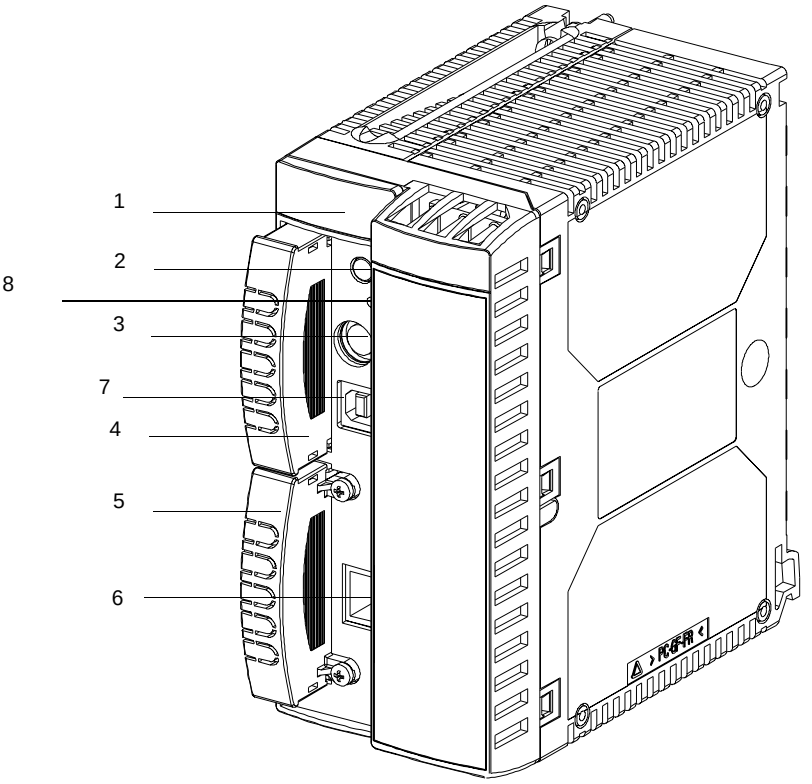
Description:

1. Display panel indicating module status: ● One green **RUN** LED. ● Two red LEDs: **ERR** and **COL**. ● Three yellow LEDs: **STS**, **TX** and **RX**. **2.** Standard connector for 10/100baseT (RJ45) interface.	Illustration: 

Physical Description of the TSX P57 5634 Processors

Illustration

The illustrations below show the different elements of a TSX P57 5634 processor.



Description

This table describes the elements of a processor module

Number	Function
1	Display block consisting of 6 LEDs.
2	Button for requesting removal of the PCMCIA SRAM card (and a DOS file or ATA in the future). This button must be pressed before removing the card; an LED shows the request status.
3	(**TER connector** (8-pin mini-DIN)) terminal port: this is used to connect an FTX or PC-compatible terminal, or to connect the PLC to the Uni-Telway bus via the TSX insulating unit TSX P ACC 01. This connector enables the peripheral connected to it to be supplied with a 5V current (within the limit of the available current provided by the power supply).
4	Slot for an extended memory card in PCMCIA type 1 format. If there is no memory card, this slot is equipped with a cover that it advisable to leave in place to protect the connectors from dust or splashes.
5	Slot for a communication card in PCMCIA type 3 format enabling a Fipio Agent, Uni-Telway, series link, Modbus, Modbus Plus, etc. communication channel to be connected to the processor. This slot can also hold a SRAM data card or an ATA card in the future. If there is no communication card, this slot is equipped with a cover.
6	RJ 45 connector for Ethernet connection.
7	USB port.
8	The **RESET** button activated with a pencil point that triggers a cold start of the PLC when used. ● **Processor operating normally:** cold start in **STOP** or in **RUN**, according to the procedure defined in the configuration. ● **Faulty processor:** forced start in **STOP**.

3.3 Ethernet Channel Characteristics

Ethernet Channel Characteristics

General

The modules have a standard interface for connecting to a 10/100baseT network and on the front panel there is a RJ45 connector for a pin-to-pin link via a link cable comprising two independent twisted pairs.

Utilities and functions supported by the modules:

Support	Utility	Protocol	Functions
TCP-IP Services	Messaging	UNI-TE	● Client/server mode. ● Synchronous requests of 256 bytes. ● Asynchronous requests of 1 Kbyte.
		Modbus	● Data exchange.
	I/O Scanner	Modbus	● Access to inputs/outputs
	Network management	SNMP	● Agent SNMP, MIB II, MIB Schneider.
	Web	HTTP	● Preset, non-modifiable website on **TSX ETY 4103/PORT**. ● Website which can be modified and increased by increments within the limit of 7.5 Mb on **TSX ETY 5103**.
	Management of IP addresses	BOOTP/ DHCP	● Client and address server
	Global Data.	UDP	● Exchange of data between stations
	Electronic Mail Notification Service	SMTP	● Reports alarms or events using emails ● Define and update text and variable information
	Time synchronization service	NTP	● Synchronizes clocks over Internet to referenced time source ● Event recording ● Event synchronization ● Alarm and I/O synchronization

3.4 Installation of TSX ETY 4103/PORT/5103 Modules and the TSX P57 5634 Processor

Introduction

This section deals with installation of the **TSX ETY 4103/PORT, TSX WMY 100** and **TSX ETY 5103** modules in a PLC, and the installation of a **TSX P57 5634** processor with an integrated Ethernet port.

What's in this Section?

This section contains the following topics:

Topic	Page
Selecting the Type of Processor	47
Wiring/Unwiring with Power Switched On	48

General

TSX ETY 4103/PORT/5103 communication modules are mounted in the rack slot of a Premium/Atrium PLC station. They can be installed in any available slot (except in an offset X Bus rack), on condition that the supply constraints of the rack are observed.

The **TSX P57 5634** processors are mounted in slots 0 or 1 in the base rack (according to the power supply selected). They occupy two slots.

Selecting the Type of Processor

Selection Guide

Selecting the processor to control the PLC station with one or more Ethernet modules will depend on the number of network connections required.

Processors	Number of network connections	Number of ETY 4103/5103 per station (*)
TSX P57 104 (1)	1	1
TSX P57 154 (1)	1	1
TSX P57 204	1	1
TSX PCI 57 204	1	1
TSX P57 254 (1)	1	1
TSX P57 2634	1	0
TSX P57 2834 (1)	1 2 (**)	0
TSX P57 304	3	3
TSX P57 354 (1)	3	3
TSX P57 3634	3	2
TSX P57 454	4	4
TSX PCI 57 454 (1)	4	4
TSX P57 4834 (1)	4	3
TSX P57 554 (1)	4	4
TSX P57 5634	4	3
TSX P57 4634	4	3
(*) Compatible with 5V power supply (**) Supports two network connections if the PLC is used in Warm Standby (1) Available for Unity Pro V2.0 or higher		

Wiring/Unwiring with Power Switched On

The Module

The **TSX ETY 4103/PORT/5103** modules can be wired or unwired when switched on without disrupting the operation of the station.
The modules do not have an internal RAM backup memory function: this will be erased when power is switched off.
The modules reset when switched on. A communication break can be expected during these interventions.

WARNING

Loss of application.

Wiring or unwiring while the **TSX P57 5634** processor is switched on is forbidden, as for the other processors.

Failure to follow this precaution can result in death, serious injury, or equipment damage.

The Link

The 10/100baseT interface RJ45 connector can be connected or disconnected when power is on. A communication break can therefore be expected in the application in progress.

3.5 10/100baseT interface

10/100base T Interface

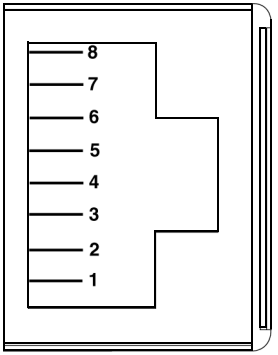
General

This interface has a standard type RJ45 connector.

Refer to the Ethernet reference manual for the connection accessories that comply with environmental circumstances the PLC requires in an industrial setting.

Pin Assignment

Illustration:



Reminder of pin assignment:

Pin	Signal
1	TD+
2	TD-
3	RD+
4	not connected
5	not connected
6	RD-
7	not connected
8	not connected

Note: If there is a connection via a shielded cable, the connector casing on the module is linked up to the ground connection.

Speed Line

The possibilities for the different speed lines for the **TSX ETY 4103/PORT/5103** modules and for the **TSX P57 5634** processor's integrated Ethernet channel are the following:

- 100 Mb in Half Duplex
- 10 Mb in Full Duplex
- 10 Mb in Half Duplex

Speed Adaptation

The speed line cannot be configured by the user. The process of self adaptation is as follows:

1	Each unit diffuses its possibilities on the line.
2	The chosen speed is the fastest of all entity possibilities on the line. In other words, speed is limited by the slowest entity on the line of which the speed possibility is the weakest.

3.6 Display, Diagnostics

Introduction

This section deals with **TSX ETY 4103/PORT, TSX WMY 100** and **TSX ETY 5103** module diagnostics using their display panel.

What's in this Section?

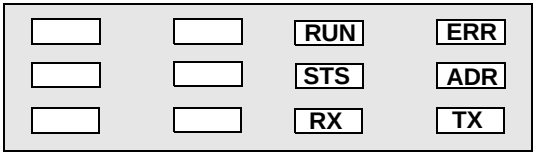
This section contains the following topics:

Topic	Page
Display Panel, Modules Diagnostics	52
Display P\anel, Ethernet Diagnostics for TSX P57 5634 Processors	53

Display Panel, Modules Diagnostics

Display Block

The display panel complies with the Premium standard



The **COL**, **RX** and **TX** LEDs are managed by the line's electronics; they indicate:

- **COL**: a collision.
- **RX**: a reception
- **TX**: a transmission.

Diagnostics

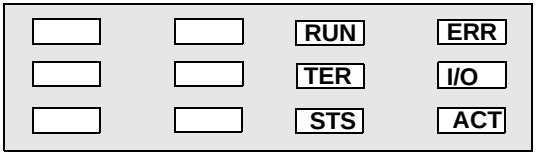
Meaning of the diagnostics LEDs:

RUN	ERR	STS	COL	TX	RX	Meaning
O	O	O	ns	ns	ns	No supply to module.
O	O	P	ns	ns	ns	Module running self-test.
P	O	O	ns	ns	ns	Module ready.
O	P	O	ns	ns	ns	Module not operational.
O	P	P	ns	ns	ns	Software operation error. Temporary state causing module reinitialization.
O	F	P, F	ns	ns	ns	Module not configured or configuration in progress.
P	O	P	ns	ns	ns	Module configured, operational.
ns	ns	F	ns	ns	ns	Module configured. Diagnostics according to how the LEDs are flashing: ● 2 flashes: module has no MAC address. ● 3 flashes: Ethernet cable not connected on the module or Hub side ● 4 flashes: the module IP address is duplicated by another IP address on the network. Conflicting remote device flashing in the same way. ● 5 flashes: module configured as a BOOTP client and is waiting for a BOOTP server response.
P	O	P	O	F	O	Ethernet communication sending.
P	O	P	O	O	F	Ethernet communication receiving.
P	O	P	O	F	F	Ethernet communication sending/receiving.
P	O	P	F	F	O	Module has detected collision.
P = Permanently on, F = flashing, O = Off, ns = not significant						

Display Panel, Ethernet Diagnostics for TSX P57 5634 Processors

Display Block

The display block for the **TSX P57 5634** processors complies with the Premium standard; it has two LEDs specific to the integrated Ethernet channel, the **STS** and **ACT** LEDs.



The dedicated Ethernet LEDs define:

- Line activity for **ACT**; this LED groups the indications of the two **RX** and **TX** LEDs for a standard TSX ETY ïïïï model.
- Module status for the **STS** LED.

Ethernet Channel Diagnostics

Meaning of the diagnostics LEDs:

I/O	STS	ACT	Meaning
O	O	O	No supply to module.
P	O	ns	Ethernet link not operational.
ns	F	ns	Module configured. Diagnostics according to how the LEDs are flashing: ● Steady flashing: Ethernet link awaiting configuration or configuration in process. ● 2 flashes: no MAC address. ● 3 flashes: Ethernet cable not connected on the module or Hub side ● 4 flashes: the IP address is duplicated by another IP address on the network. Conflicting remote device flashing in the same way. ● 5 flashes: the Ethernet channel is configured as a BOOTP client and is waiting for a BOOTP server response. ● 7 flashes: the version of the Ethernet firmware is incompatible with the PLC processor firmware version (in cases where there are updates and user downloads).
O	P	ns	Ethernet link configured, operational.
O	P	F	Ethernet communication sending/receiving.
P = Permanently on, F = flashing, O = Off, ns = not significant			

3.7 Electrical Characteristics

Electrical Characteristics

General

The **TSX ETY 4103/5103** modules can be inserted in any rack slot of a Premium/ Atrium station (except in the X Bus offset rack).

Table of consumption:

Voltage	**Power Consumption**		**Power Dissipation**	
5 volts	Typical	Maximum	Typical	Maximum
TSX ETY 4103/PORT/5103	360 mA	400 mA	1.8 W	2.1 W

Note: The electrical characteristics of the **TSX P57 5634** Ethernet processors are given in the processor presentation manual.

3.8 Standards

Norms and Standards

Compliance with Standards

The **TSX ETY 4103/PORT** and **TSX ETY 5103** modules, as well as the Ethernet link of the **TSX P57 5634** processor comply with the following standards:

- UL 508
- CSA
- IEC 61131-2
- Marine classification

3.9 Operating Conditions

Operating Conditions

Applicable Conditions

- **Conditions of use:**
  - Temperature from 0 to +60° C
  - Relative humidity between 10% and 95% (without condensation) at 60° C
  - Altitude of between 0 and 4500 meters
  - ImmUnity Pro to vibrations complies with the IEC 68-2-6 standard, Fc test
  - ImmUnity Pro to shocks complies with the IEC 68-2-27 standard, Ea test
  - ImmUnity Pro to free fall, hardware dealt with as per the IEC 68-2-32 standard, method 1
  - IP 20 protection index
- **Storage conditions:**
  - Temperature from -40° C to +85° C
  - Relative humidity between 0% and 95% (without condensation) at 60° C

Software Installation for Ethernet Communication

III

At a Glance

This part describes the software installation of communication on an Ethernet network using Unity Proware.

What's in this Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
4	Facilities	59
5	Configuration Parameters	121
6	Method for Programming an Ethernet Network	159
7	TSX ETY 110 Module	167
8	Modules TSX ETY 4103, TSX ETY PORT, TSX WMY 100 and TSX ETY 5103	199
9	Ethernet Coprocessor	251
10	Ethernet Language Objects	285
11	Questions/Answers	313

Facilities

4

Introduction

This chapter introduces the main points of the different facilities used by the modules.

What's in this Chapter?

This chapter contains the following sections:

Section	Topic	Page
4.1	TCP/IP Messaging	60
4.2	IO Scanning Facility	78
4.3	DHCP utility	84
4.4	SNMP Facility	89
4.5	Global Data Utility	91
4.6	Managing Faulty Devices	93
4.7	Time Synchronization Service	94
4.8	Electronic Mail Notification Service	95
4.9	HTTP Onboard Server/Embedded Web Pages	96
4.10	Bandwidth Monitoring	118
4.11	ETHWAY Facility	119

4.1 TCP/IP Messaging

Introduction

This section mentions the functions and characteristics of the TCP/IP profile.

What's in this Section?

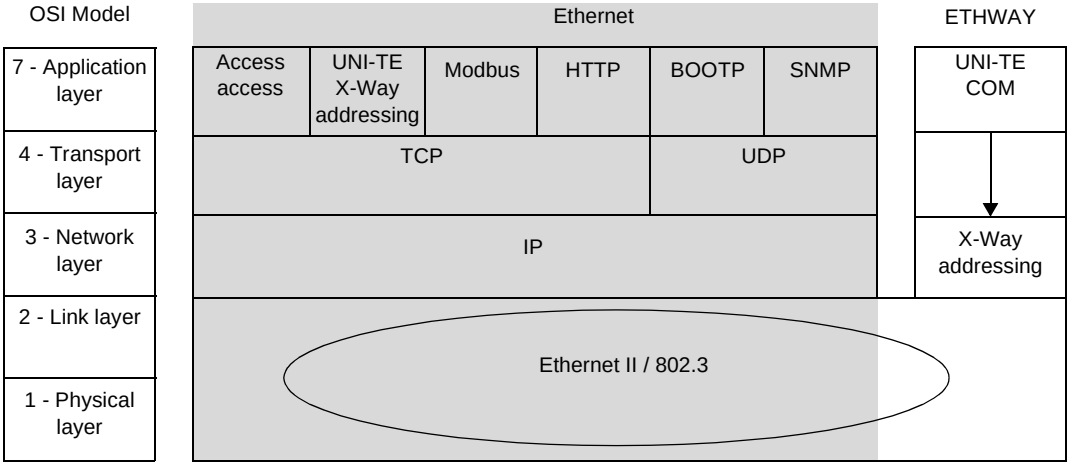
This section contains the following topics:

Topic	Page
Summary of TCP/IP Characteristics	61
Address Management	62
IP Address	64
Sub Addressing and SubNetwork Mask	66
UNI-TE Communication	68
Modbus Communication on the TCP/IP Profile	69
Architecture Supported by a Modbus Communication on the TCP/IP Profile	71
Modbus Messaging on the TCP/IP Profile	72
Managing the TCP Connections for X-Way UNI-TE and Modbus	74
Opening a Connection	75
Closing a Connection	76
What Happens when a Connection is Broken	77

Summary of TCP/IP Characteristics

TCP/IP Communication Profile

The following diagram illustrates the make-up of a typical TCP/IP stack.



Communication Port

The communication port reserved for the TSX ETY or TSX ETY PORT module or the Ethernet link of the TSX P57 5634 is port TCP 502. When a client wishes to access the server of these modules, it must send towards this port.

Timeout on TCP Connection

If a TCP connection cannot be established (when the destination is absent for example), the timeout error occurs after 80 seconds.

Each communication function timeout must be set to a value higher than 80 seconds if the first exchange was not successfully completed.

"Keep Alive" Frame

The TCP layer sends a frame almost every 2 hours so that breaks in connection can be detected (i.e. cable disconnection, detection of power outage from the client by a server etc.).
The use of this mechanism is explained further on in this chapter (see ***p. 77***).

Address Management

At a Glance

When implementing Ethernet modules, you can manage the following addresses:
- MAC address
- IP address
- X-Way address

CAUTION

Address duplication

Two devices with the same address can result in unpredictable events on the network.

Failure to follow this precaution can result in injury or equipment damage.

MAC Address

General case
This address is unique for each Ethernet module. It is defined in the factory by the module manufacturer.

Exception
For the TSX ETY 110 module, this address is derived from the X-Way address using the code selectors situated on the front panel of the module.
It is defined in the following way: `00.80.F4.00.<network number>.<station number>`

Note: Given the risk of possible duplicate addresses, you must ensure that it conforms to the companyís addressing scheme.

IP Address

General case
You define this address yourself when configuring the module. On the same local network, this address must be unique.

Exception
For the TSX ETY 110 module, this address can be derived from the MAC address. For the TSX ETY 4103, TSX ETYPORT and TSX ETY 5103 modules and the Ethernet link of the TSX 57 5664 and, in the absence of confirmation by Unity Pro, this address is, by default, derived from the MAC address.

X-Way Address

General case

All devices have an X-Way address linked to the IP address by the module configuration. This address must be unique within the entire X-Way architecture.

Special Cases

For the TSX ETY 110 module, the X-Way address is defined using the code selectors on the module. These selectors code the network number and the station number.

The Ethernet link built into the processors does not require an X-Way address.

IP Address

At a Glance

Each device connected to the network should have a **unique IP address**.

When the type of network environment is open, the uniqueness of the address is guaranteed by the authorized organism in the country where the network is located by assigning it a network identifier.
If the type of environment is closed, the uniqueness of the address is managed by the company's network manager.

The TSX ETY4103/PORT/5103 modules and the Ethernet link of the TSX P57 5634 can have their address dynamically allocated by an address server (see ***p. 84***) or have their address configured by the user.

Address Composition

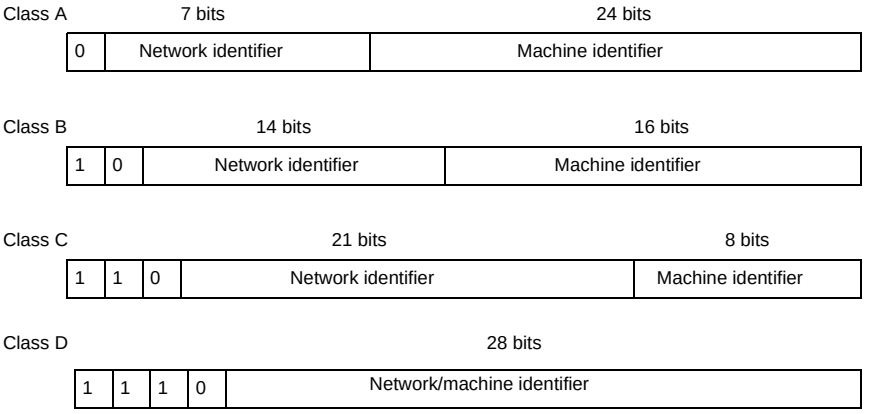
This address is made up of two identifiers, one of which identifies the network, the other identifies the connected machine.

An IP address is defined on 32 bits. It is made up from 4 decimal numbers, each coded on a bit (example: 140.186.90.3).

Depending on the network span, four address classes can be used:
- Class A applies to large span networks, which have a large number of connected stations.
- Class B applies to medium span networks, which have fewer connected stations.
- Class C applies to small span networks, which have few connected stations.
- Class D is used for multicast. A class D address must not be allocated to a module.

Structure

Depending on the class, an address is structured in the following way:



The following table displays the spaces reserved for the different IP address classes:

Class	**Range**
A	**0**.0.0.0 to **127**.255.255.255
B	**128**.0.0.0 to **191**.255.255.255
C	**192**.0.0.0 to **223**.255.255.255
D	**224**.0.0.0 to **239**.255.255.255

Sub Addressing and Subnetwork Mask

Introduction

In an open environment, after a network identifier has been obtained from the accredited body, the local system administrator is able to manage several subnets.

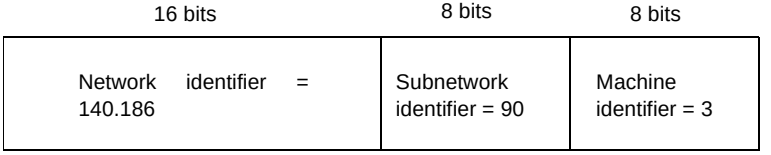
This will allow local networks to be installed without changing anything for the outside world which will still only be able to see the network indicated by the network identifier.

Sub Addressing

This sub addressing function is possible by splitting the machine identifier into the following:

- a subnet identifier
- a machine identifier

Example: sub addressing for a class B address
(IP address in question: 140.186.90.3)



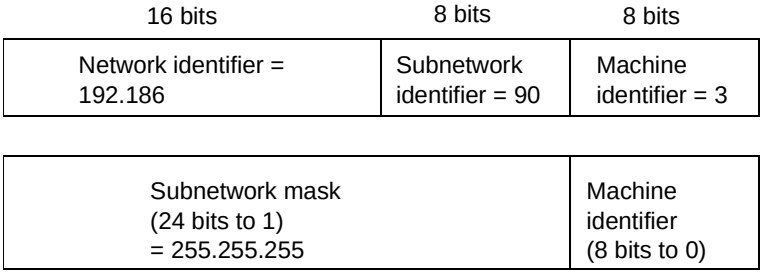
Mask

The subnet mask is used to find out the number of bits allocated respectively to the network identifier and the subnet indicator (bits to 1), and then to the machine identifier (bits to 0).

The value of the subnet mask must be chosen to comply with the IP address class. It will have the value (xxx: value chosen left up to the user):

- for a class A address: 255.xxx.xxx.xxx,
- for a class B address: 255.255.xxx.xxx,
- for a class C address: 255.255.255.xxx.

Example: class C subnet mask (IP address in question :192.186.90.3)


16 bits
8 bits
8 bits
Network identifier = 192.186
Subnetwork identifier = 90
Machine identifier = 3
Subnetwork mask (24 bits to 1) = 255.255.255
Machine identifier (8 bits to 0)

Note: This division allows 254 possible subnets with 254 machines per subnet.

UNI-TE Communication

At a Glance

Two data exchange utilities are offered depending on the type of server used:
- either synchronized data exchanges on the MAST task,
- or data exchanges performed as a background task in the following modes:
  - asynchronous server mode,
  - asynchronous client mode.

Synchronous Exchanges

In server mode
All the PLC's UNI-TE requests are supported by the Ethernet module.

In client mode
This type of exchange enables UNI-TE requests to be sent using the functions:
- READ_VAR,
- WRITE_VAR,
- SEND_REQ,
- DATA_EXCH,
- ...

Asynchronous Exchanges

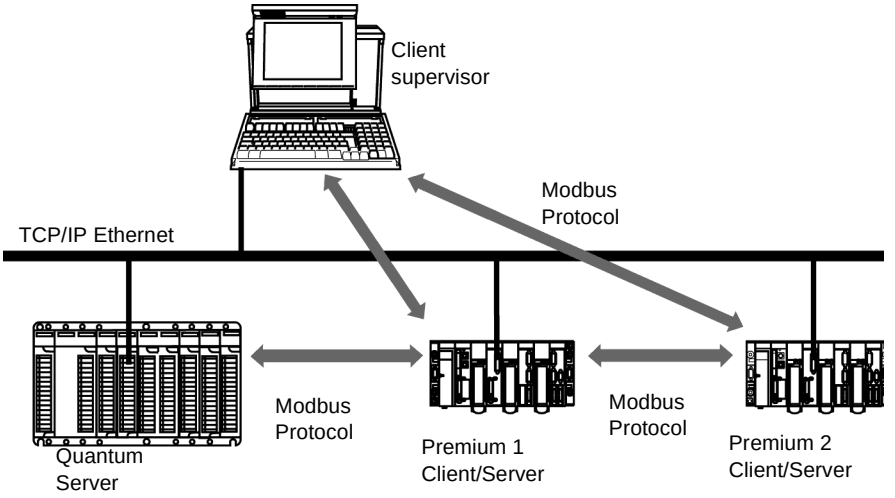
In server mode
The consistency of the data read or written can be guaranteed (guarantees that the request is sent in one cycle) by setting the system bit %S91 to 1.
In this configuration, a Jitter phenomenon of 1.5 ms can appear on the MAST task.

In client mode
This utility allows messages to be exchanged using the requests:
- READ_ASYN: enables up to 507 words (%MW) or 8112 bits (%M) to be read through the asynchronous messaging channel.
- WRITE_ASYN: enables up to 510 words (%MW) or 8160 bits (%M) to be written through the asynchronous messaging channel.

Modbus Communication on the TCP/IP Profile

At a Glance

This utility enables communication to be established through the Modbus protocol between a Premium PLC and a Quantum PLC or another Premium PLC and supervisor software on PC or other device complying with the Modbus protocol.



The same module can communicate with a remote device in client mode (for example a Quantum PLC) and another remote device in server mode (for example a supervisor PC).

The Premium PLC 1 is the client to the Quantum PLC. It opens the TCP-IP connection and sends Modbus messages to the Quantum.

The Premium PLC 2 is the server to the supervisor. The supervisor has opened a TCP/IP connection and sends Modbus messages to the Premium 2.

Precautions for Use

The UNI-TE and Modbus double profile is not supported on the same Premium remote station. In other words, a station A cannot, at a given moment, have Modbus communication and Uni-TE communication towards a station B.

Special case for the TSX ETY 110 module

The Client/Server modes are exclusive to a given remote device in order to improve communication performance. PLC applications and network architectures must be designed to ensure that switching from one mode to another between the same two devices is as rare as possible.

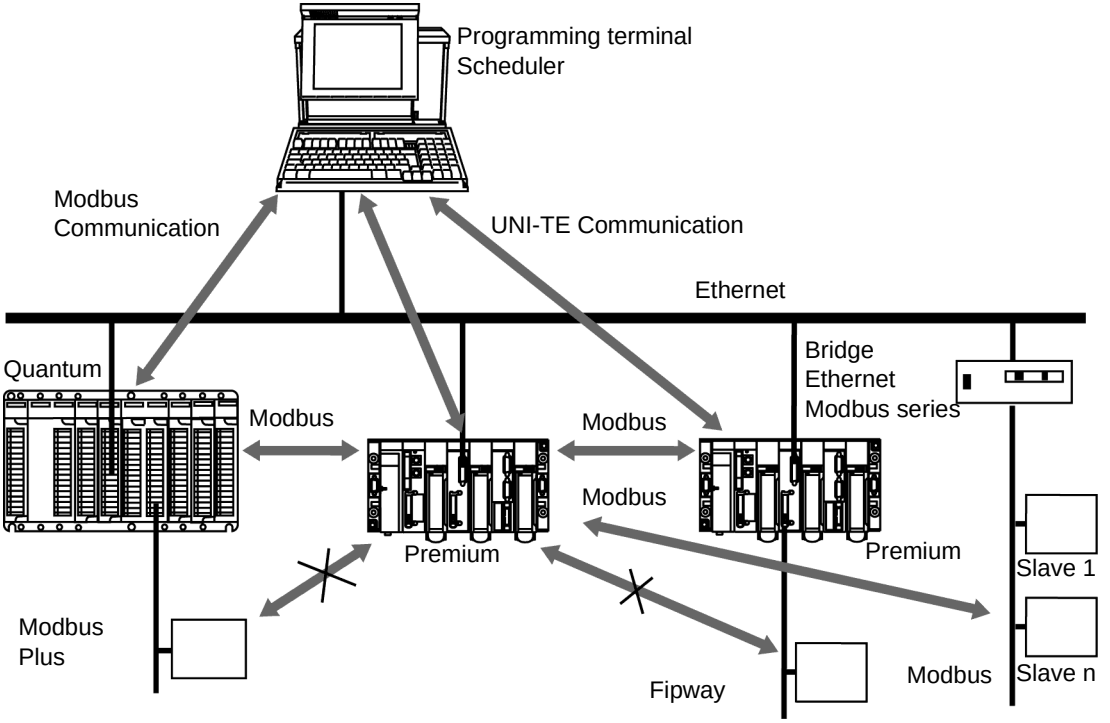
Furthermore, frequent switching could lead to messages being lost:

- If the Premium PLC communicates in server mode with a Quantum PLC that has opened the TCP/IP connection, the issuing of a message by the client Unity Pro application will cause the server TCP/IP connection to close down after any server transactions in progress have been processed.
- If the Premium PLC that has opened the TCP/IP connection communicates in client mode with a Quantum PLC, a request to open the connection from the Quantum will cause the client TCP/IP connection to close down with the possible loss of any client transactions in progress.

Architecture Supported by a Modbus Communication on the TCP/IP Profile

Introduction

The following diagram illustrates the architecture supported.



Accessibility

The Modbus protocol guarantees interoperability between the Premium station and the Quantum station on a TCP/IP Ethernet network.
On the other hand access from a Premium PLC to a Modbus Plus network connected to the Quantum PLC is not possible via TCP/IP.
In the same way the Modbus protocol cannot cross X-Way Premium bridges.
Communication between a Premium PLC on the Ethernet network with a remote device connected to a Modbus series bus is possible if you use a series linked Ethernet/Modbus gateway (type 174 CEV 300 10).

Special Case for the TSX ETY 110 Module

For a TSX ETY 110 module, communication between a Premium PLC on the Ethernet network with a device connected to the Modbus series bus is not possible.

Modbus Messaging on the TCP/IP Profile

Introduction

The communication functions are the same as those described in the communication functions on Modbus.

Installation Principle

Although a remote Modbus station does not have an X-Way format address, each communication function will use an X-Way format address to designate a remote IP station.

For each remote Modbus station, you must configure the pair in the correspondence table (IP address, {network.station} X-Way) where:

- network: network number of the local X-Way station,
- station: 100 to 164 = logical number of the X-Way station.

Example: the X-Way address {2.108} is associated with the IP address 139.160.2.8.

This address will only be used by the local Premium module. It is not sent over the network.

In the case of a remote Premium station configured with the Modbus protocol, it is advisable to give an X-Way station address that is the same as the number of the local station, incremented by 100.

Sending Communication Functions

When communication functions are sent by the application to a remote device connected to a Modbus bus via a serial link Ethernet/Modbus gateway, the function address must be as follows:

ADDR(é{network number. station number}0.0.Modbus address of destinationí)

The network number and station number correspond to the X-Way address of the Ethernet/Modbus 174 CEVïïï gateway. The Modbus destination address corresponds to the Modbus slave address.

Example: a READ_VAR function is sent to slave 10 on the Modbus serial bus. The gateway IP address is 139.160.2.8 and the X-Way address {2.108}.

```
READ_VAR(ADDR(í{2.108}0.0.0.10í), ...)
```

Data Exchange

The following requests are addressed to the device with which you wish to perform variable read or write operations.

Modbus requests	Function code	Communication function
Read bits	16#01	READ_VAR
Read words	16#03	READ_VAR
Write a bit or n bits	16#05 or 16#0F	WRITE_VAR
Write a word or n words	16#06 or 16#10	WRITE_VAR
Read input bits	16#02	SEND_REQ
Read input words	16#04	SEND_REQ

Correspondence of Object Types

This table describes object type correspondence between a Premium PLC and a Momentum or Quantum PLC.

Premium objects	Quantum or Momentum objects
%MW: internal words	4x... memory area
%M: internal bits	0x... memory area
%IW: input words	3x... memory area
%I: input bits	1x... memory area

Managing the TCP Connections for X-Way UNI-TE and Modbus

Introduction

The connection can be opened either by the local PLC or by a remote station which wants to communicate with the local PLC.

A connection is characterized by the pair:
(local TCP port, local IP address; remote TCP port, remote IP address)

Note: Managing the connections is transparent for the user.

Opening a Connection

Introduction

A connection can be opened:
- either by a request from a remote device,
- or by a request from the local PLC.

With a Remote Device

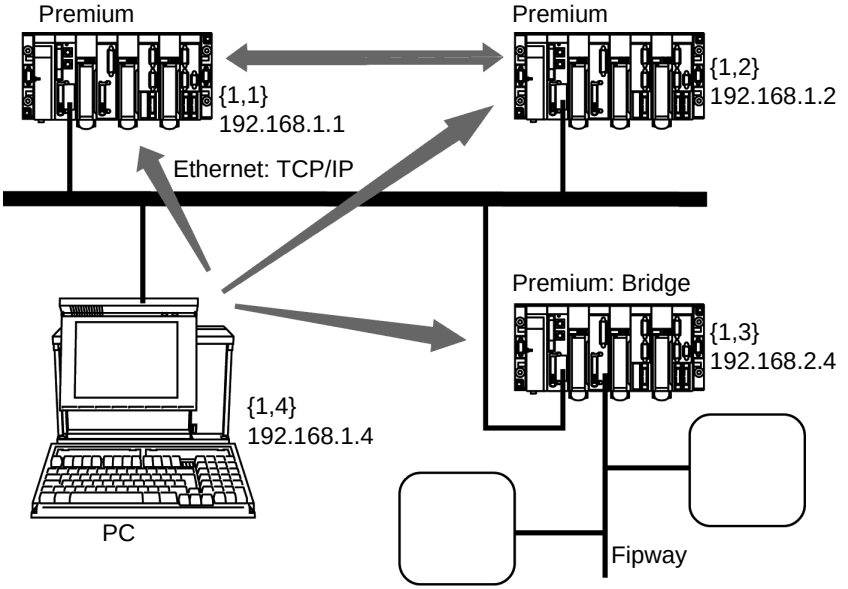
The module prepares for a connection coming from a remote device.
When the connection is received, verification of the IP address of the remote machine is done if and only if access check is activated. This test consists of checking that this address is on a list of remote machines authorized to connect. If the test is positive the connection is opened. If not the connection remains closed.

With a Local PLC

When a message is sent out by a communication function, if there is no connection with the remote device, this is opened automatically internally by the module to the remote 502 port.

Examples

Example of connections



In the example opposite, four TCP connections are open for communication between the terminal and the PLC stations or between two PLC stations.
The terminal is always able to open connections.
Either of two PLCs CANopen the connection between them (the client PLC).

Closing a Connection

At a Glance

Connections can be closed in two different ways:

- by the remote station deciding to end communication and sending a TCP/IP connection closure,
- by the local PLC where the maximum number of open connections is reached (the connection that has been open the longest is then closed).

Closure of a connection is indicated to the application by means of an error report (message refused) on any exchanges in progress.

What Happens when a Connection is Broken

Introduction

A break in connection can be of two types:

- disconnection of the network cable (cable disconnected or cutÖ ..)
- disappearance of the remote device (break down, power cutÖ).

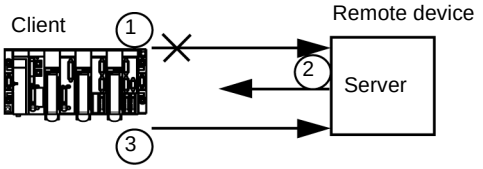
Loss of connection is detected after 2 hours by the Keep Alive request.
If within this time the connection is re-established, re-starting communications is different according to the type of break.

Reconnecting the Cable

In this case the break in connection is caused by a network cable but the two stations remain operational.
When the cable is reconnected communication between the ETY module and the remote device will start again on the TCP/IP connection that was opened previously.

Server Remote Device

The remote device that disappeared was the server.



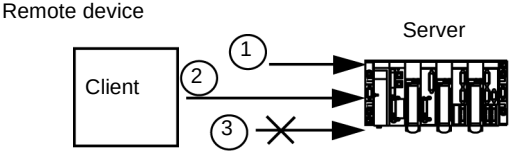
1 The client ETY module is still sending out data on the old connection (which remains half open).

2 The server receiving the information without associated connection sends out a Reset command and closes the old connection.

3 The client ETY module opens a new connection.

Client Remote Device

The remote device that disappeared was the client.



1 The client opens a new connection.

2 The server ETY module receives the request to open a new connection.

3 The server ETY module closes the old connection (if there is nothing in progress) and authorizes the new one.

4.2 IO Scanning Facility

Introduction

This section presents the functions and characteristics of the IO Scanning facility.

What's in this Section?

This section contains the following topics:

Topic	Page
IO Scanning Service	79
Read and Write Zones	81
Scanning Period	83

IO Scanning Service

At a Glance

The input/output scanner is used, periodically, to read or write remote inputs/outputs on the Ethernet network without specific programming.

This service comprises the following essential elements:
- a read zone which groups together all the values of remote inputs,
- a write zone which groups together all the values of remote outputs,
- scanning periods which are independent of the PLC cycle and are specific to each remote device.

Recommendations for Use

Scanning is only performed when the PLC is in Run mode.

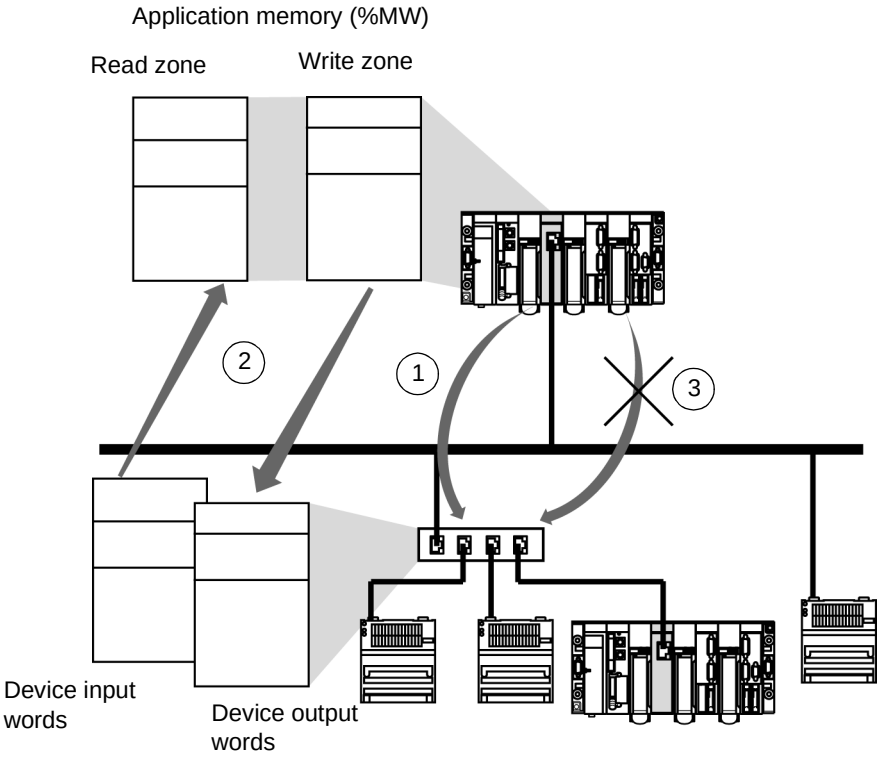
This service operates with all devices supporting Modbus communication on the TCP/IP profile in server mode.

The exchange mechanism, which is transparent to the user, is carried out with the following requests:
- read requests,
- or write requests,
- or read and write requests.

Note: Certain types of scanned devices, such as TSX ETY modules, only support read requests or write requests (simultaneous read/write requests are not supported).

Operation

The following diagram shows how the scanning of remote inputs/outputs works.



1. As soon as the PLC switches to Run mode, the module opens up one connection for each scanned device (one connection for each line entered in the table of scanned elements).
2. Then the module periodically reads inputs words, and periodically writes output words for each device.
3. If the PLC switches to Stop mode, the connections to each device are closed.

Summary of Functionality

The IO scanning service functionality is:

- to manage the connection with each remote device (one connection per device scanned),
- to scan the inputs/outputs of the device using Modbus read/write requests on the TCP/IP profile,
- to update the read and write zones in the application memory,
- to refresh the status bits for each remote device.

Note: These bits show whether the module's input/output words have been refreshed.

Read and Write Zones

At a Glance

These two zones in the application memory, managed by the Ethernet module, are tables of internal words (%MW), which contiguously group all input and output word values for connected remote devices.

Remote input and output type of devices are supplied with:

- input words used to send back the values of the inputs to the module,
- output words used to assign the value of the outputs to the remote device.

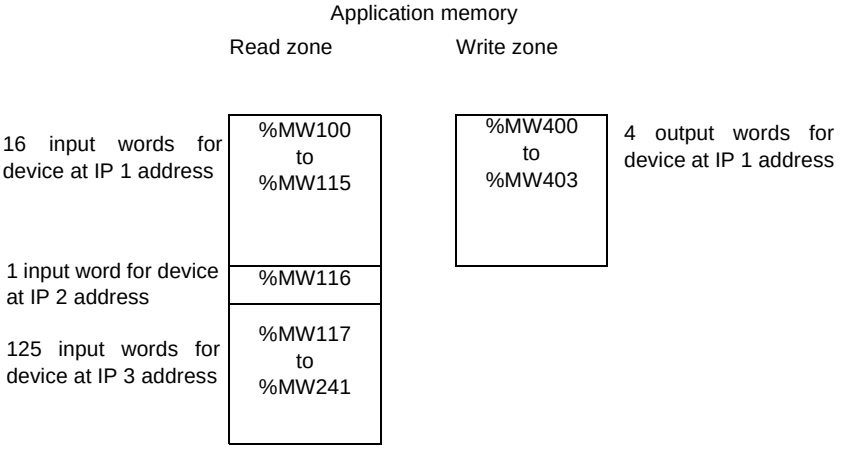
Note: Refer to the documentation for each device for the number and details of input and output words to be managed.

Example

The Ethernet module scans three devices:

- a Momentum at the address IP1 (type 170 AA1 140 00: 16 analogue inputs): this module has 16 input words and 4 output words.
- a Momentum at the address IP2 (type 170 AA1 340 00: 16 discrete inputs): this module has one input word.
- a Premium PLC at the address IP3 with the zone %MW1000 to %MW1125 reserved as input words.

The read zone begins at %MW100 and the write zone at %MW400.


Application memory
Read zone
Write zone
16 input words for device at IP 1 address
%MW100 to %MW115
%MW400 to %MW403
4 output words for device at IP 1 address
1 input word for device at IP 2 address
%MW116
125 input words for device at IP 3 address
%MW117 to %MW241

Note: The fields dedicated to remote devices must not have any overlap. Equally, the read and write zones must not have any overlap.

Note: scanned devices (read or write) must be located on the same network as the scanner device. Crossing a bridge is not allowed.

Note: a Momentum 170 can be read-scanned by several modules, but only one module is allowed to write-scan it.

Scanning Period

At a Glance

Remote input/outputs are scanned periodically depending on the application requirements.

A scanning period is defined for each device through configuration, according to the update speed.

Note: The lower the scanning period, the faster the input/outputs are updated. However, this speed increases the network load.

Note: %SW8 and %SW9 do not stop remote station scanning, but inhibit the copying of I/Os to and from the application variables.

4.3 DHCP utility

At a Glance

This section describes the functions and characteristics of the DHCP utility.

What's in this Section?

This section contains the following topics:

Topic	Page
Dynamic Assignment of Addresses	85
DHCP Servers	87

Dynamic Assignment of Addresses

At a Glance

DHCP (Dynamic Host Configuration Protocol) is a start-up protocol for terminals or stations without disks via a centralized management of network parameters.
The DHCP servers are used to supply an IP address to a station that starts on the network.
The TSX ETY 4103/PORT/5103 module or the Ethernet link of the TSX P57 5634 can be configured as the DHCP server. They can also have their address configured by the user or dynamically allocated from an address server (configuration as BOOTP client).

Note: the DHCP server can also respond to the BOOTP protocol.

BOOTP Client

In this context, a module, configured as a BOOTP client, transmits requests on the network every second while it is starting up until it obtains a reply.

The remote device acting as the BOOTP/DHCP server responds to this request and assigns to the client module:

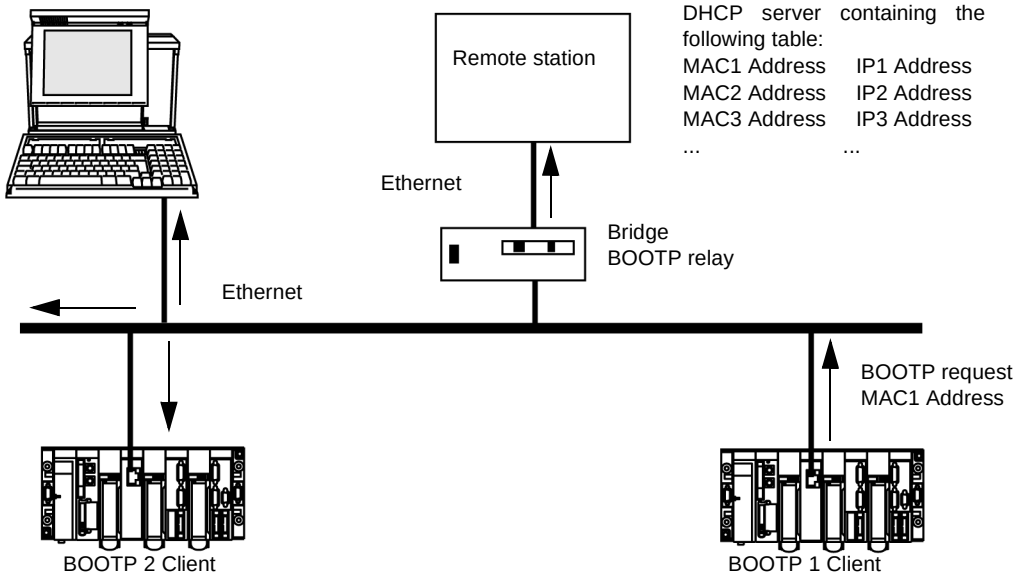
- an IP address,
- the gateway IP address,
- the corresponding subnetwork mask.

Note: the display of this information from a browser connected on the HTML pages of the rack display on the web server is sometimes inaccurate. Therefore you must connect a Unity Proware application on the PLC concerned in order to obtain the real values.

Note: If the absence of the address server or if there is no response, the client module does not start.

Example

The following diagram shows the routing of requests during start-up of a station on the network:



DHCP Servers

At a Glance

In this context, the module is used as a server for starting-up client stations.

In listen mode, the server responds to the clientsí requests and sends them their IP address configuration.
To do this, the server device has a table, which groups:

- correspondence between the MAC addresses or the Names (Role Names) of the client stations and the IP addresses,
- the Netmask and the Gateway,
- The names and access paths to the parameter files (see ***p. 93***).

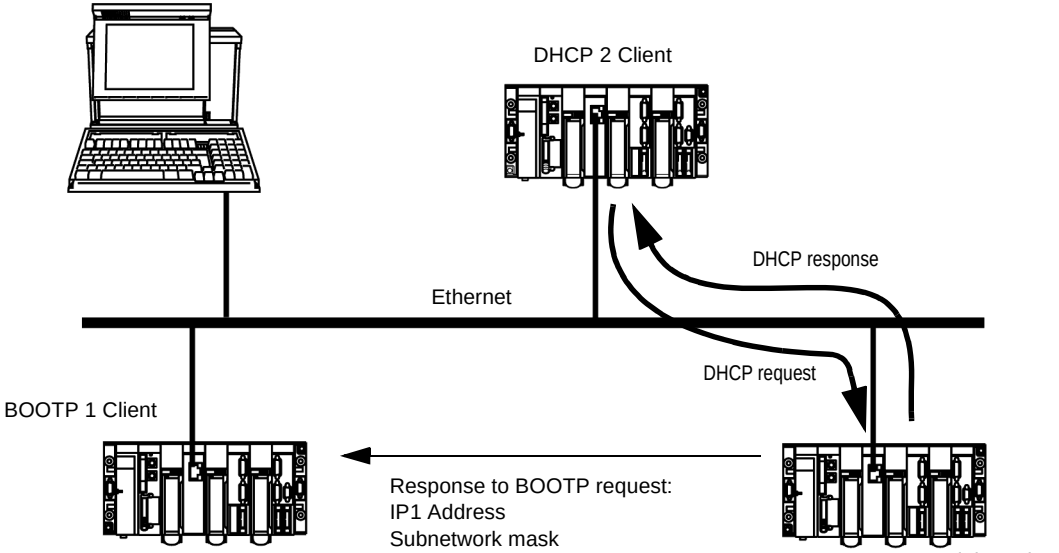
Note: The server (present on the TSX ETY and TSX ETY PORT modules and the Ethernet link of the TSX P57 5634) only supplies network configuration data to client stations connected to the local area network.

Precautions for Use

When a module is used as a server for starting scanned stations (see ***p. 78***), you must avoid configuring the PLC in **automatic start in RUN mode** . If you do not, there is a risk that stations such as the Momentum 170s will not be able to obtain their IP address when the DHCP server restarts.

Example of DHCP Server

The following diagram shows the routing of requests when responding to a start-up request from the server:



Note: The subnetwork mask and the address of the gateway belong to the DHCP server.

4.4 SNMP Facility

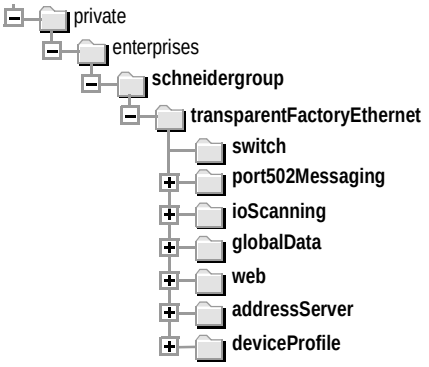
SNMP Communication on UDP/IP

Introduction

The SNMP (Simple Network Management Protocol) standard defines network management solutions in terms of protocol and the exchange of supervised data.

The SNMP structure relies on the following essential elements:
- The **Manager** allows entire or partial network supervision,
- One or more **Agents**. Each supervised device has a software module named **Agent** used by the SNMP protocol.
- A **MIB** (Management Information Base) is a data base or collection of objects.

The SNMP utility agent is implemented on the TSX ETY modules and on the Ethernet link of the processors. This allows a Manager to access MIB-II standardized objects from the agent TSX ETY via the SNMP protocol. The MIB-II allows management of TCP/IP communication layers.
On the TSX ETY 4103/PORT/5103 module and on the Ethernet link of the TSX P57 5634, it is also possible to access objects from the MIB Ethernet Transparent Factory, which provide specific information on Global Data, I/O Scanning and Messaging utilities.
Branching view of the MIB Ethernet Transparent Factory:



The source file of the private MIB Ethernet Transparent Factory is available on the TSX ETY 4103/PORT/5103 module and on the Ethernet link of the TSX P57 5634. It can be downloaded from an internet navigator by clicking on the "Download MIB file" link on the HTTP server index page (see ***p. 108***). This file may be compiled by the main SNMP Managers on the market.

The SNMP Protocol

The SNMP protocol defines 5 types of message between the agent and the manager. These messages are encapsulated in the **UDP** datagrams.
Messages from the manager to an agent:

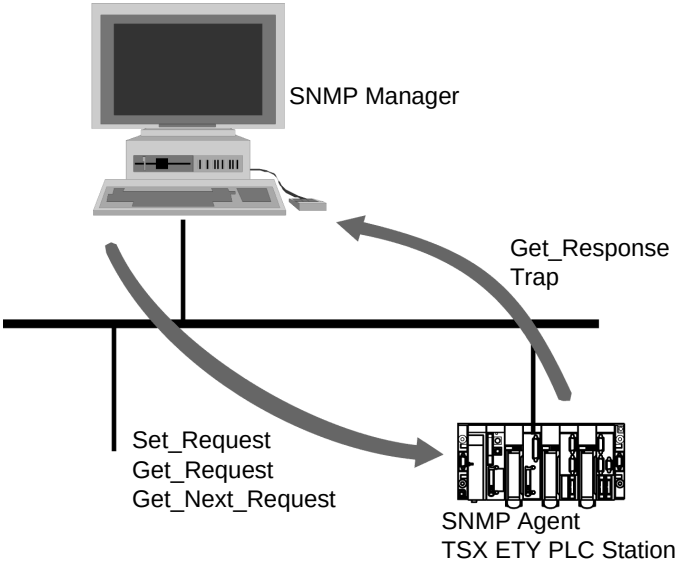
- `Get_Request`: message used to obtain the value of one or more variables.
- `Get_Next_Request`: obtains the value of the next variables.
- `Set_Request` : sets the value of a variable.

Messages from an agent to the manager:

- `Get_Response`: allows the agent to re-send the value of the requested variable.
- `Trap`: allows asynchronous event signaling by the agent.

Description of the Utilities

The SNMP manager transmits read or write requests (`Set_Request`, `Get_Request`, `Get_Next_Request`, etc.) for objects defined in the MIB - II SNMP, and the SNMP agent of the TSX ETY module responds.



The module's SNMP agent transmits events (Traps) to the Manager. The managed Traps systems are as follows:

- `Coldstart Trap`:
  - For the TSX ETY 110 module, the event is transmitted following a module supply Reset.
  - For the TSX ETY 4103/PORT/5103 modules and the Ethernet link of the TSX P57 5634, the event is transmitted following a module supply Reset, or following a processor Reset, or following the downloading of an application to the PLC.
- `Authentication Failure Trap`: event transmitted following an authentication problem. The **CommUnity Pro Name** field in the received message is different to the one configured on the module. This trap can be enabled when configuring the module.

4.5 Global Data Utility

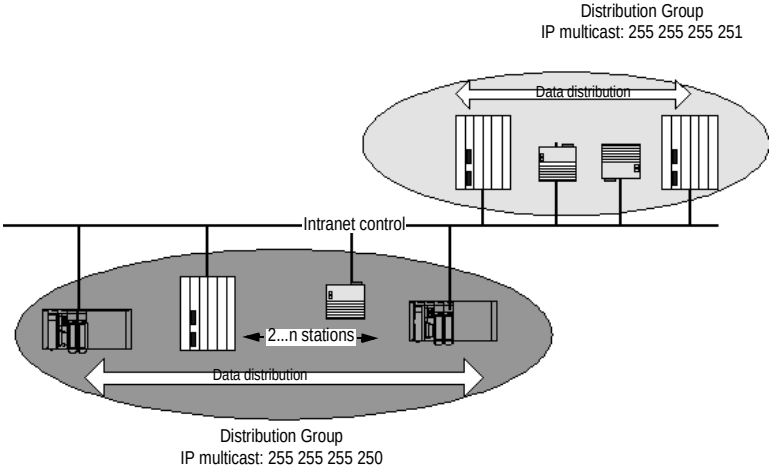
Global Data Utility

At a Glance

The aim of the Global Data utility, which is supported by the TSX ETY 4102/PORT/ 5103 modules and the Ethernet link of the TSX P57 5634, is to provide an automatic data exchange for the coordination of PLC applications.

Operation

The communication modules are regrouped in a **Distribution Group** to exchange the variables used for PLC co-ordination.
Each communication module **publishes** a local application variable for the other communication modules in the Distribution Group.
Each communication module can also **subscribe** to the application variables published by all other modules sharing the Distribution Group, whatever its location.
An **Application Variable** is a group of contiguous words from a PLC.
The Global Data utility should be configured (see ***p. 225***) to determine the slot and the number of application variables published and subscribed by each communication module. Once the modules are configured, exchanges between the communication modules sharing the same Distribution Group are automatically carried out when the PLC is in RUN mode.



A **Distribution Group** is a group of communication modules identified by the same multicast IP address. Exchanges in "multicasting" are used to distribute Global Data. Several independent Distribution Groups can co-exist on the same subnetwork with their own multicast address.
A Publication/Subscription protocol on UDP/IP is used for data distribution.
The publication of a variable is synchronized at the start of the PLC cycle.
Subscribed variables are copied in the PLC application memory at the end of the cycle.
The PLC memory zones that receive the various subscribed variables should not be recovered.

Health Bits

A **Health bit** (Status bit) is associated to each application variable.
This status bit indicates the validity of each subscribed variable: it is 1 if the variable has been published and received in the configured validity time limit (see ***p. 226***), otherwise it is 0.

Multicast Filtering

The Global Data utility uses **Multicasting**.
On account of this broadcasting principle, the multicast frames transmitted by a module are repeated on all switch ports, which generates network congestion.
When the switches possess this function, **Multicast Filtering** allows multicast frame spreading to be limited to only the ports that require it.
The protocol used to establish the list of ports involved in data traffic is **GMRP**.

Operating Modes

The operating modes are as follows:
- Stopping the PLC **stops** Global Data exchanges
- The use of the I/O forcing system bits (%S9, %SW8, %SW9) **does not stop** Global Data exchanges

Limits

There are no theoretical limits for the number of stations sharing a Distribution Group. The main limitation is the number of variables exchanged in the Distribution Group (64 variables).

4.6 Managing Faulty Devices

Replacing Faulty Remote Stations

At a Glance

The objective of this utility is to provide automatic recovery of remote I/O module parameters or intelligent modules connected to a Transparent Factory Ethernet sub-segment. When exchanging a faulty module with a functioning module.

Objective

The objective of this utility is:

- to supply an IP address to a remote station from the Name given to this station (**Role Name**)
- to give a remote station the capacity to store parameters and also to recover them, if required.

Operation

This utility requires the use of the DHCP server (see ***p. 87***) and the FTP/TFTP server of the TSX ETY 4103, PORT, 5103 modules or the Ethernet link of the TSX P57 5634.
It can manage up to 96 remote stations.

Utility operating principle:
Initially:
1. The valid remote station obtains an IP address from the name that has been given to it (Role Name).
2. The valid station gives its configuration parameters to the server.
Secondly:
This station breaks down. It is replaced with a non-configured device of the same type, which has the same name as the station it replaces:
1. It then transmits a DHCP request to the server.
2. It receives its configuration file, which was saved first on the server.
3. The remote station restarts automatically.

Note: The Role Name is limited to 16 characters in ASCII.

4.7 Time Synchronization Service

Time Synchronization Service

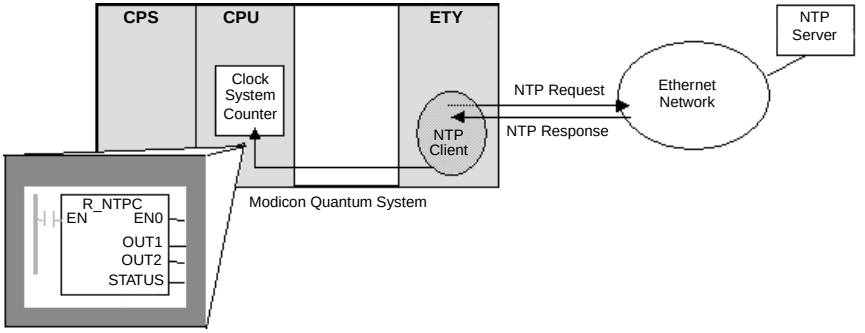
General

The time service synchronizes computer clocks over the Internet. For example, the time of one client is synchronized either with another server or to a referenced time source like a radio or satellite receiver.
Typical time service configurations utilize multiple redundant servers and diverse network paths to achieve high accuracy and reliability. Time service accuracy can be within a millisecond on LANs and up to a few tens of milliseconds on WANs.
Use the time service for

- event recordingó sequence events
- event synchronizationó trigger simultaneous events
- alarm and I/O synchronizationó time stamp alarms

Time Synchronization and Time Stamps

On an Ethernet network, all controllers should be synchronized with the same clock time, which is provided by an NTP server. In each application program, events or application data (IO values for example) can be time stamped using the application stacks.
The Premium Ethernet interface module, an ETY 5103, connects to an NTP time server and provides the source-time synchronization signal, which is sent to the CPU.
To read the clock, a function block is used in the controllerís project (application program).



4.8 Electronic Mail Notification Service

Electronic Mail Notification Service

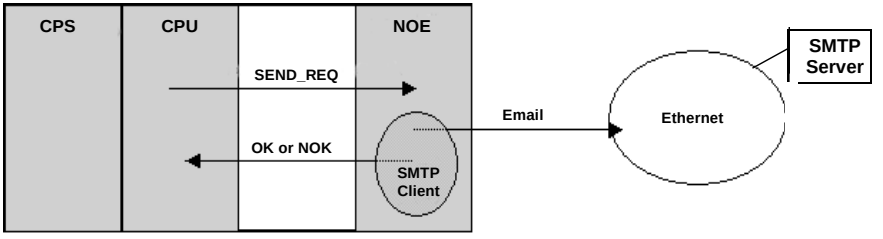
General

The electronic mail notification service allows controller-based projects to report alarms or events. The automation controller monitors the system and can automatically create an electronic mail message alert with data, alarms, and/or events. Mail recipients can be either local or remote.

- Based on predefined events or conditions, messages are created using the SEND_REQ function block.
- The email message is constructed from predefined headers plus variables and text (a maximum of 238 bytes). This message is sent directly from the automation system to the local email server.
- Mail headers contain common predefined itemsó recipient list, sender name, and subject. These items can be updated by an authorized administrator.

Mail Service Client

The ETY 4103, ETY PORT, and ETY 5103 Ethernet modules and the P57 5634/ 4634 modules include an SMTP client. When the module receives a specific request from the controller, the module sends an email message to the mail server.



4.9 HTTP Onboard Server/Embedded Web Pages

Introduction

This section describes the functions and characteristics of the onboard server or embedded web pages. The Web pages offer both configuration and diagnostic information (see ***p. 121*** and ***p. 108***).

What's in this Section?

This section contains the following topics:

Topic	Page
Embedded HTTP Server	97
HTTP Server Home Page	99
HTTP Server Index Page	100
HTTP Server Security Page	101
Address Server Page for the HTTP Server	103
HTTP Server Rack Display Page	105
HTTP Server Data Editor Page	106
Ethernet Module Diagnostic Pages	108
NTP Diagnostics Page	114
Email Diagnostics Page	116
HTTP Server User Pages	117

Embedded HTTP Server

At a Glance

Some modules include an embedded Web server, which allows:
- access to PLC data,
- diagnostics to be carried out on the entire configuration.

All the processor or module data is presented as standard Web pages in HTML format. Access Web pages with Internet Explorer 4.0 or higher running JDK 1.1.4 or higher.

None of the functions supplied by the Web site require any prior configuration or programming within the module.
The summary table below shows the various selections possible.
According to the type of module, the availability of these functions changes:

Function	**TSX ETY 110**	**TSX ETY 110 WS**	**TSX ETY 4103 TSX ETY PORT TSX P57 5634**	**TSX ETY 5103**	**TSX ETY 210**
Server	-	X	X	X	-
Predefined pages	-	-	X	X	-
Client pages	-	X	-	X	-
Client site size	-	1.2 Mb	-	6.5 Mb	-
Minimum FactoryCast version	-	V 3.0	-	V 3.01	-

Legend	
X	Available
-	Not available

Embedded Server Functions

The functions available on an embedded server are generally as follows:
- statistics: this page shows the Ethernet network statistics,
- security: this page is used to modify the user name and the password to access the site,
- address server: if the module is used as an address server, this page enables you to display and modify the server table,
- displaying the rack: this page enables you to display the configuration of the PLC which is controlling the module,
- data editor: this page allows you to display PLC data.
- diagnostics functions: these pages allow network diagnostics.

Connections to a TSX ETY Module

The module web-site shows static and dynamic pages (PLC data). To refresh dynamic pages, an X-Way connection is automatically created between the web browser and the module.

Note: The browser connection X-Way address is automatically derived from the moduleís address by taking the same network number and a station number between 54 and 63. It is therefore essential to leave at least one X-Way address free in this range of values.

The number of connections is regulated:

- it is not possible to connect several browsers on a given PC to the same TSX ETY module,
- up to 10 PCs connected simultaneously to one module,
- on a TSX ETY 4103/PORT/5103 and on the Ethernet link of the TSX P57 5634, it is possible to connect a browser and another application (e.g.: an XIP driver).

HTTP Server Home Page

At a Glance

This page is the Web site home page. It allows you to select:
- the site language: by default the page is displayed in English,
- to access the site utilities page.

How to Access the Home Page

The following procedure shows you how to access the web site home page.

Step	Action
1	Open your usual browser.
2	Enter the IP address of the Ethernet module in the line provided.

Illustration

By way of example, the home page of a TSX ETY 4103, a TSX ETY PORT or the Ethernet link of the TSX P57 5634 is as follows.

Schneider Automation Web Server

Diagnostics and Online Configurations

French **German** **Italian** **Spanish**

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Note: the TSX ETY 5103 home page has several differences:
- The heading is: **FactoryCast Web Server**.
- Two hypertext links accessing client pages are offered:
  - Protected user pages
  - Unprotected user pages

See the **FactoryCast** documentation for information on creating pages.

Language Management

The site is multilingual. The language is selected by clicking on the link in the home page and it remains the language for subsequent connections.

Note: Some displays are in the language of the Windows installation (e.g. address bar, etc.)

HTTP Server Index Page

At a Glance

This page displays the various utilities supported by the Ethernet modules and the link to access the required utility.

How to Access the Page

The following procedure shows how to access the index page from the home page.

Step	Action
1	Click on the **Diagnostics and Configuration** link on the home page. **Result**: a window requesting the user name and password appears.
2	Enter the user name and password using the correct case (i.e. upper or lower case). **Note**: the default values of the fields are: ● for the user name: USER ● for the password: USER
3	Confirm with **OK**.

Illustration

By way of example, the index page of a TSX ETY 4103, a TSX ETY PORT or the Ethernet link of the TSX P57 5634 is as follows.

Schneider Automation Web Server

Home
Address Server
Security
Rack Viewer
Data Editor
Email Configuration
Ethernet Module
Support

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HTTP Server Security Page

At a Glance

This page can be used to modify:
- the user name and the password for accessing the index page,
- the password for writing variables in the data editor

The size of the user name and passwords is a maximum of 15 characters in non-extended ASCII.

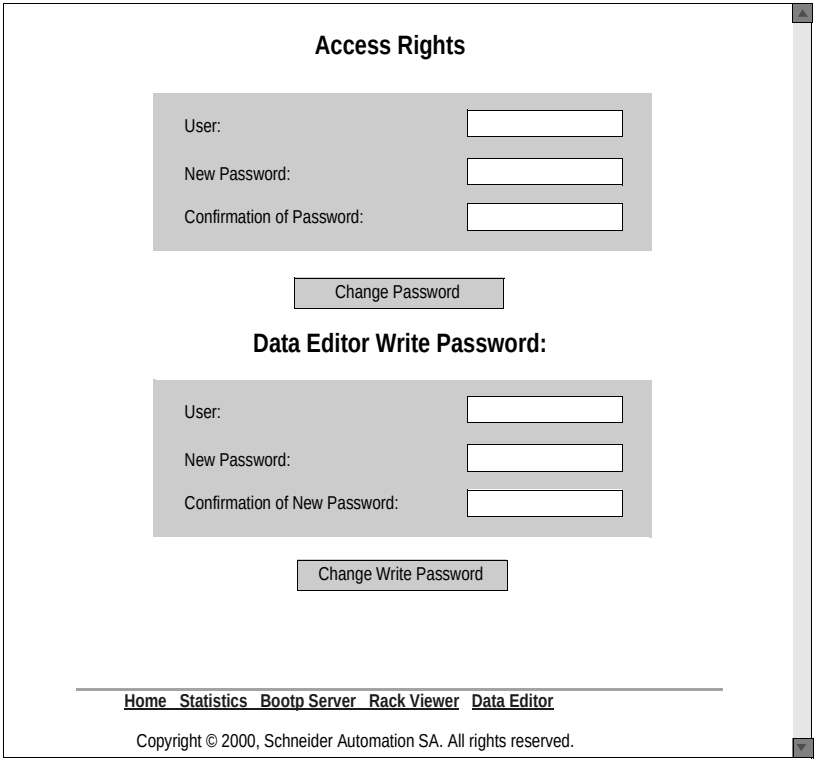
How to Access the Page

The following procedure shows how to access the security page from the index page.

Step	Action
1	Click on the **Security** link.

Illustration

By way of example, the security page of a TSX ETY4103, a TSX ETY PORT or the Ethernet link of the TSX P57 5634 is as follows.



How to Modify HTTP Access Rights

The procedure is as follows:

Step	Action
1	Enter the new **User** name.
2	Enter the new password.
3	Confirm the new password.
4	Confirm the modification using the **Change password** button. **Result:** an **Ethernet Configuration** page appears.
5	Click on the **Reboot Device** button to recognize the modification in the module.

How to Modify the Write Password

The procedure is as follows:

Step	Action
1	Enter the current password using the right case (i.e. upper or lower case). **Note:** the default value of this field is: USER.
2	Enter the new password.
3	Confirm the new password.
4	Confirm the modification with the **Change password** button. **Result:** an **Ethernet Configuration** page appears to indicate that the password has been modified.

Address Server Page for the HTTP Server

At a Glance

This page is used to display or modify the correspondence table between the MAC addresses or the Name (Role Name) and the IP addresses of the module if the latter is configured as a BOOTP server (see ***p. 84***).

This function is useful when replacing a failed remote device (e.g. replacing a faulty Momentum module).

Note: This page does not allow the addition of new inputs, nor the modification of the Name (Role name) for a remote device.

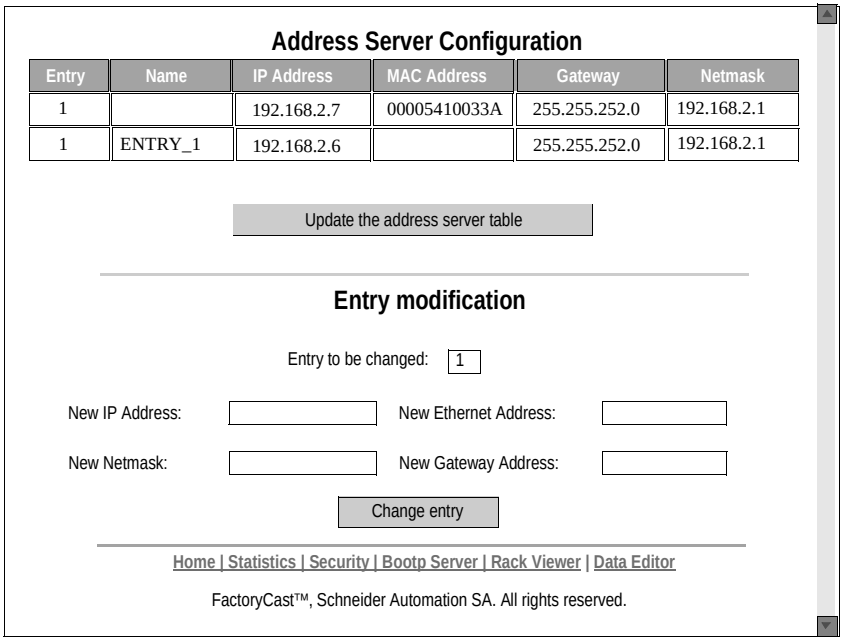
How to Access the Page

The following procedure shows how to access the Address server page from the index page.

Step	Action
1	Click on the **Address server** link.

Illustration

By way of example, the Address Server page of a TSX ETY4103, a TSX ETY PORT or the Ethernet link of the TSX P57 5634 is as follows.



How to Modify the Table

The procedure is as follows:

Step	Action
1	Enter the entry number to be modified in the field provided.
2	Enter the new IP address to be modified in the field provided.
3	Enter the new MAC address to be modified in the field marked: **New Ethernet Address**.
4	Is the server locked in run mode? ● If so: enter the password associated to the address server then go to step 5. ● If not: go to step 5.
5	Confirm the modification with the **Change entry** button.
6	Click on the **Refresh Address server table** button to display the modification on the screen.

Recognition of Modifications

Configuration modifications are recognized either after a cold restart of the PLC, or on the next loading of the PLC application.

HTTP Server Rack Display Page

At a Glance

This page allows you to carry out diagnostics on the modules in the local rack configuration that includes the Ethernet module.

By clicking on a module in the configuration, you obtain a set of diagnostic information on this module:

- LED status display,
- the type and the version of the module as well as its position in the rack,
- information specific to the functions of the module.

Note: For further information, refer to the FactoryCast User Guide documentation.

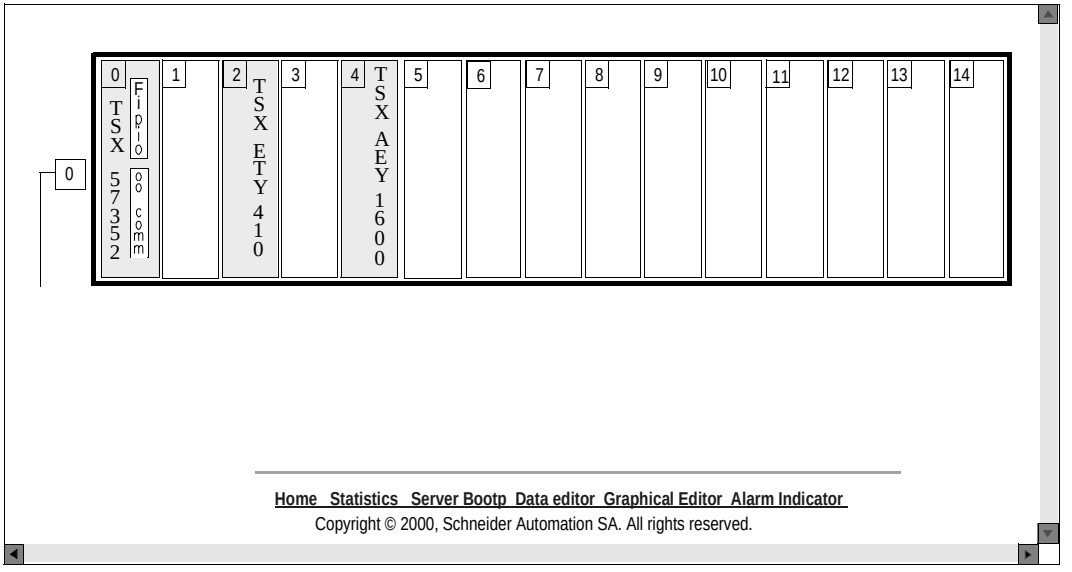
How to Access the Page

The following procedure indicates how to access the rack display page from the index page.

Step	Action
1	Click on the **Rack Display** link.

Illustration

The TSX ETY4103 rack display page is presented below as an example.



HTTP Server Data Editor Page

At a Glance

This page is used to create animation tables containing lists of PLC variables to be displayed or modified.

Variables can only be accessed via addresses.

This function is useful when running diagnostics on an application.

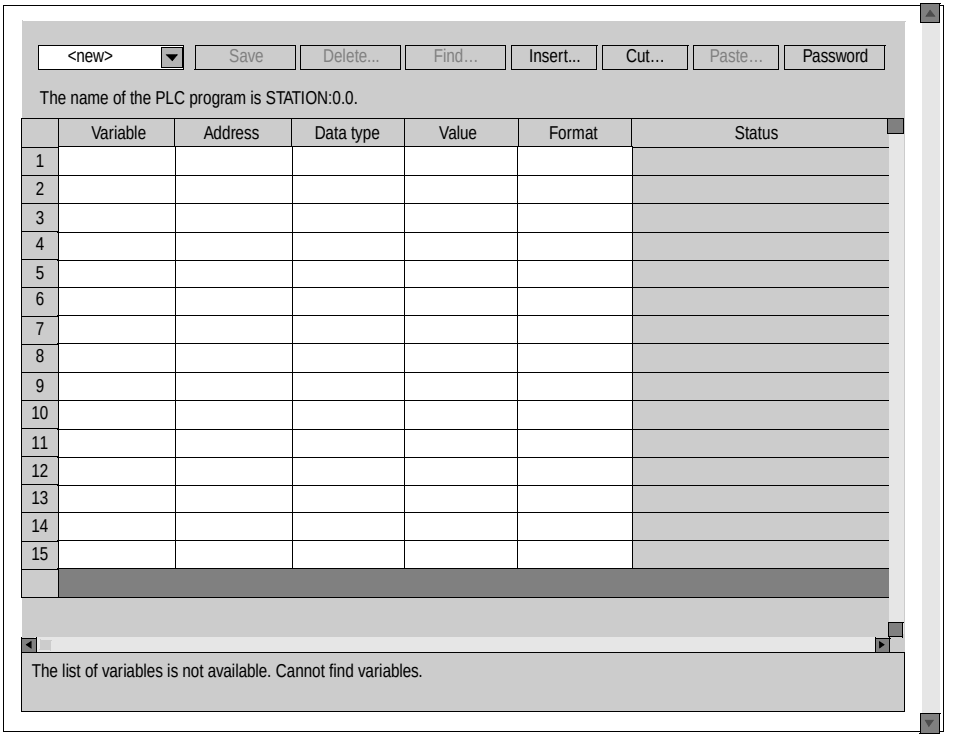
Note: Write access is managed by password. For further information, refer to the FactoryCast User Guide documentation.

How to Access the Page

The following procedure indicates how to access the data editor page from the index page.

Step	Action
1	Click on the **Data Editor** link.

Illustration The Data Editor page of a TSX ETY 4103 or an TSX ETY PORT is presented below as an example.



Ethernet Module Diagnostic Pages

Home Page

This page contains a list of links for accessing the different diagnostic pages for the Ethernet module:

- Global Data Utility
- IOScanner Utility
- Messaging utility
- Bandwidth monitoring utility
- Ethernet module statics

A link also allows the downloading of the private MIB source file.
View of the Diagnostics Utilities home page:

Ethernet Link Diagnostic

Global Data
IO Scanning
Messaging
Bandwidth Monitoring
Statistics
Email Diagnostics
Properties
Upload MIB file

Home **Index**

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Click on a link to access the desired diagnostics page.

Global Data Page

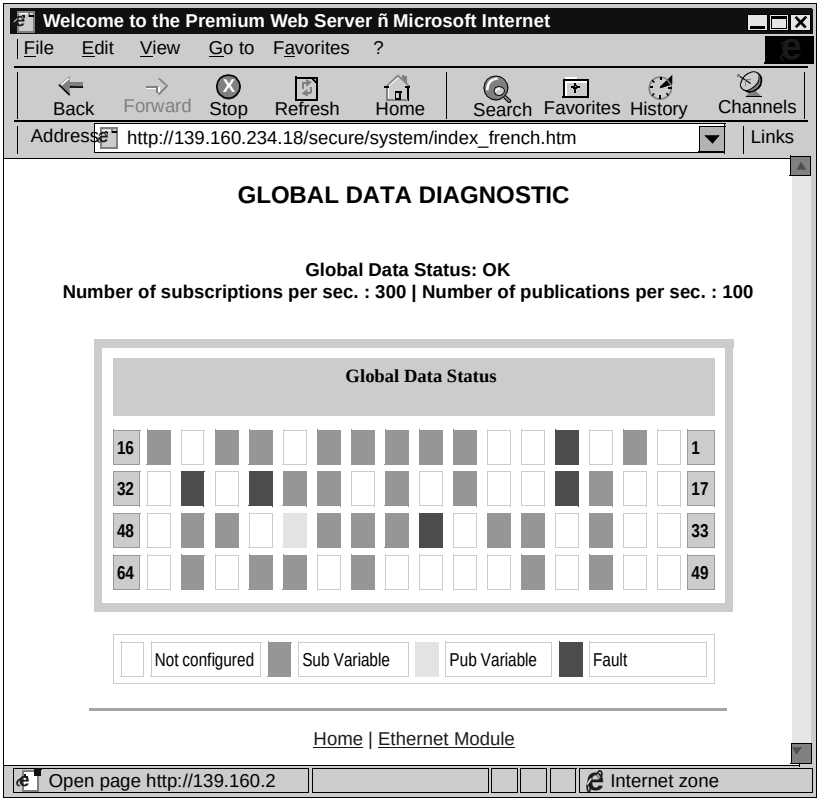
Information on the general diagnostics of Global Data can be found at the top of this page:

- Status
- Number of publications per second
- Number of subscriptions per second

This page also shows a table that regroups all published and subscribed variables in the same distribution group. Each variable is identified by its Identifier.

- Green for the subscribed variables
- Yellow for the published variables
- White for all unconfigured variables
- Red for variables with communication faults

View of the Global Data diagnostics page:



I/O Scanner Page

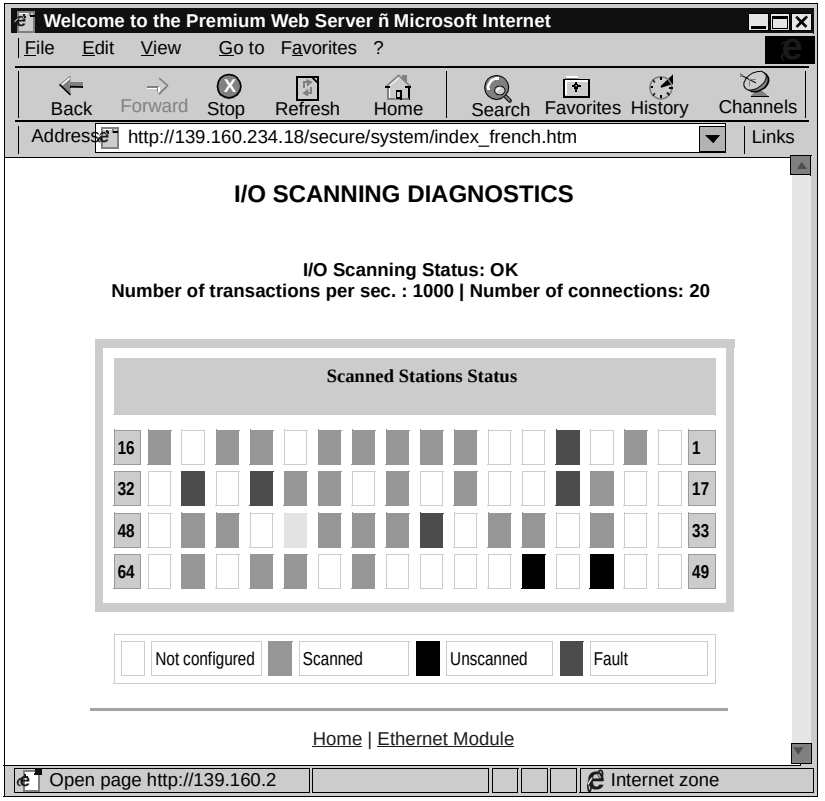
Information on the general diagnostics of the I/O Scanner utility can be found at the top of this page:

- Status
- Number of transactions per second
- Number of connections per second

This page also displays a summary of the status of all modules:

- Green for the **scanned** modules
- White for the **unconfigured** modules
- Red for **faulty** modules
- Black for the modules which are temporarily **unscanned**.

View of the IOScanner diagnostics page:



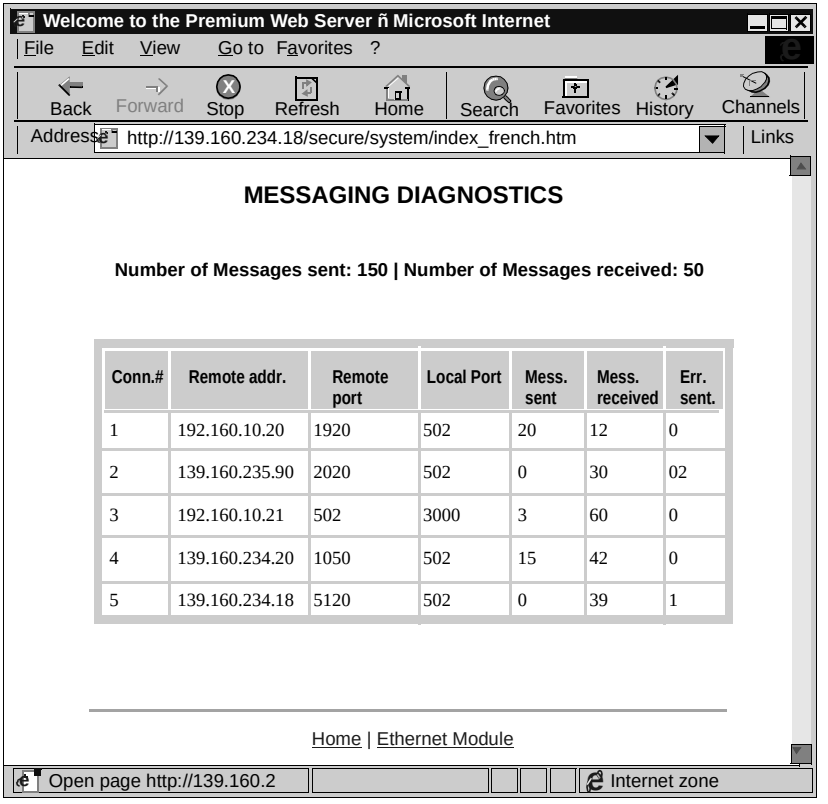
Messaging Page

This page provides current information on the open TCP connection on port 502. The number of sent/received messages on the port can be found at the top of this page.

A table provides, for each connection (numbered from 1 to 64):

- The remote IP Address
- The remote TCP port
- The local TCP port
- The number of messages sent from this connection
- The number of messages received from this connection
- The error number on this connection

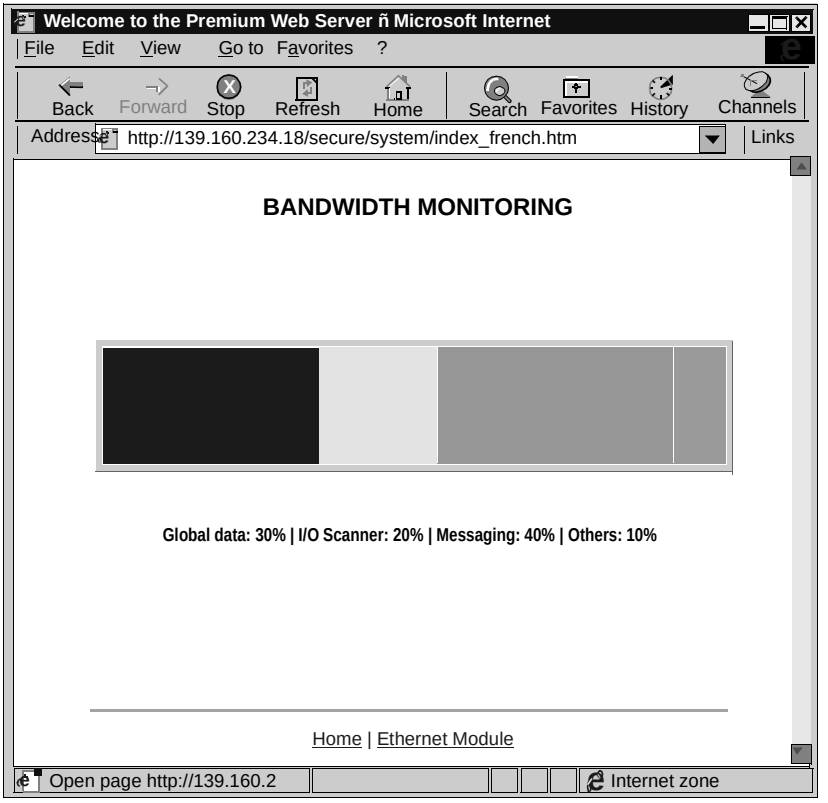
View of the messaging diagnostics page:


Welcome to the Premium Web Server ñ Microsoft Internet
File Edit View Go to Favorites ?
Back Forward Stop Refresh Home Search Favorites History Channels
Address http://139.160.234.18/secure/system/index_french.htm
Links
MESSAGING DIAGNOSTICS
Number of Messages sent: 150 | Number of Messages received: 50
Conn.# | Remote addr. | Remote port | Local Port | Mess. sent | Mess. received | Err. sent.
1 | 192.160.10.20 | 1920 | 502 | 20 | 12 | 0
2 | 139.160.235.90 | 2020 | 502 | 0 | 30 | 02
3 | 192.160.10.21 | 502 | 3000 | 3 | 60 | 0
4 | 139.160.234.20 | 1050 | 502 | 15 | 42 | 0
5 | 139.160.234.18 | 5120 | 502 | 0 | 39 | 1
Home | Ethernet Module
Open page http://139.160.2
Internet zone

Bandwidth Monitoring Page

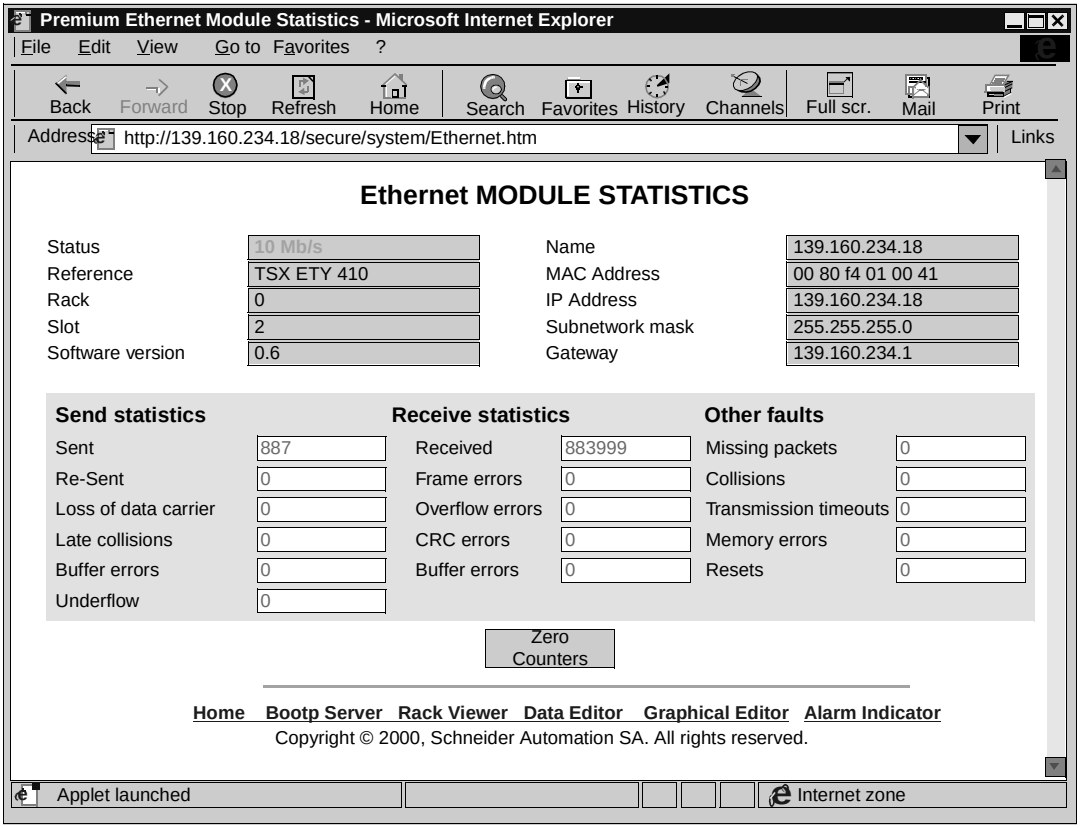
This page displays the load distribution of the TSX ETY 4103/PORT/5013 module or the Ethernet link of the TSX P57 5634 between the Global Data, IOScanner and Messaging utilities and other utilities.

View of the Bandwidth monitoring page:


Welcome to the Premium Web Server ñ Microsoft Internet
File Edit View Go to Favorites ?
Back Forward Stop Refresh Home Search Favorites History Channels
Address http://139.160.234.18/secure/system/index_french.htm
Links
BANDWIDTH MONITORING
Global data: 30% | I/O Scanner: 20% | Messaging: 40% | Others: 10%
Home | Ethernet Module
Open page http://139.160.2
Internet zone

At a Glance

This page shows the Ethernet network statistics. It is used to perform diagnostics on a disturbed network.
View of the statistics page of a TSX ETY4103, a TSX ETY PORT or the Ethernet link of the TSX P57 5634:



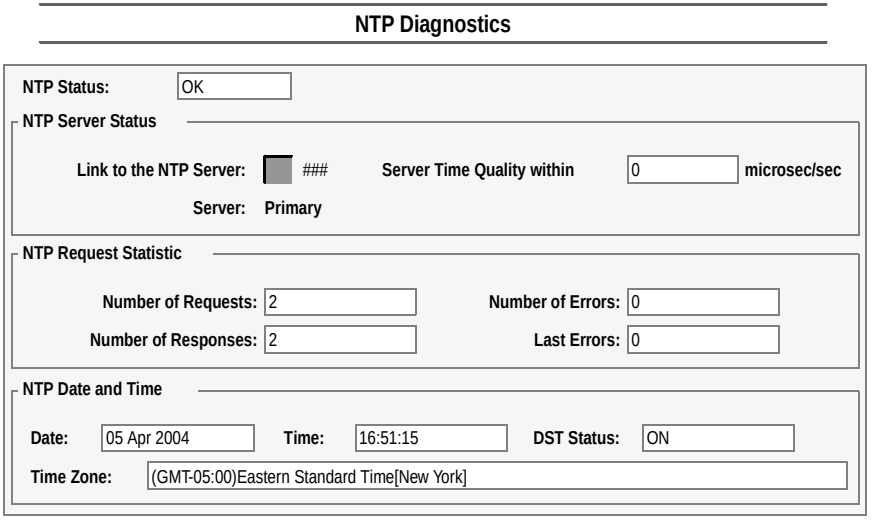
NTP Diagnostics Page

NTP Diagnostic Dialog

Time synchronization service parameters:

Parameter	Description
NTP status	Service is correctly configured (OK)
NTP server status	NTP client is connected to the NTP server, and if the server is Primary or Standby
NTP requests	Total number of client requests sent to the NTP server
NTP responses	Total number of server responses sent from the NTP server
Number of errors	Total number of unanswered NTP requests
Last error code	Last error code received from the NTP client
Date	Date in d/m/y format
Time	Time
Time zone	Time zone plus or minus Universal Time, Coordinated (UTC)
DST	Daylight saving time (DST) parameter is either **1.** on (enabled) **2.** off (disabled)

The dialog:



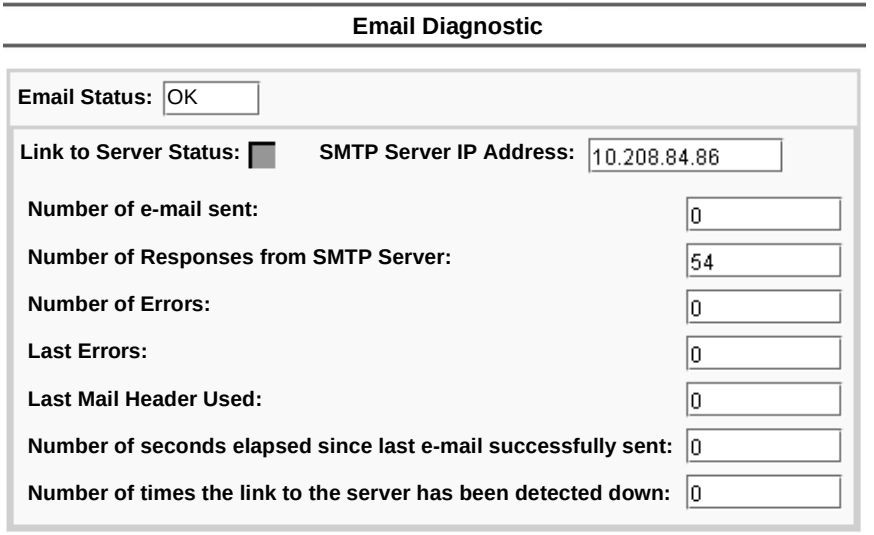
Last Error Field Last Error field displays values, which indicate the type of error.

Type of Error	Value
Component OK and running	0
Excessive network traffic or server overload	1
Bad parameters in the configuration	3
Component is disabled	4
Incorrect IP	9
Time zone file absent	14
Syntax error in the customrules file	15

Email Diagnostics Page

Email Diagnostics

The dialog


Email Diagnostic
Email Status: OK
Link to Server Status:
SMTP Server IP Address: 10.208.84.86
Number of e-mail sent: 0
Number of Responses from SMTP Server: 54
Number of Errors: 0
Last Errors: 0
Last Mail Header Used: 0
Number of seconds elapsed since last e-mail successfully sent: 0
Number of times the link to the server has been detected down: 0

Electronic mail notification service parameters

Parameter	Description
Email status	Email service is correctly configured (OK).
Link to Server Status	Ethernet module is connected to the SMTP server Status is checked at start-up and at least every 30 minutes after start-up ● Green = module connected to server ● Red = module NOT connected to server
SMTP Server IP Address	IP address of the SMTP server
Number of e-mails sent	Total number of emails sent successfully
Number of Responses from SMTP Server	Total number of SMTP messages received from the SMTP server
Number of Errors	Total number of e-mails NOT sent because of an error
Last Errors	Reason for the last error with a code in hexadecimal. 0 displays if no error occurs
Last Mail Header Used	Last header used by giving the number.
Number of seconds elapsed since last e-mail successfully sent	Counts the number of seconds since the last email was successfully sent.
Number of times the link to the server has been detected down	Number of times the SMTP server could not be reached. (Link checked every 30 minutes.)

HTTP Server User Pages

At a Glance

It is possible to create complete pages about certain modules. To do this, the FactoryCast software and a guide for creating and publishing user pages are delivered with these modules.

Note: The TSX ETY5103 module is delivered with the FactoryCast V3.01 (or above) CD and the accompanying guide for creating and publishing user pages.

There are two types of pages:
- pages that are protected by passwords,
- and pages that are not protected by passwords.

How to Access Protected User Pages

The following procedure shows how to access the protected user pages from the home page.

Step	Action
1	Click on the **Protected user pages** link. **Result**: the dialog box for entering the password appears.
2	Enter your user name and password, then confirm. **Result**: the first branch page on the created site appears.

How to Access Unprotected User Pages

The following procedure shows how to access the unprotected user pages from the home page.

Step	Action
1	Click on the **Unprotected user pages** link. **Result**: the first branch page on the created site appears.

4.10 Bandwidth Monitoring

Bandwidth Monitoring

At a Glance

Ethernet Transparent Factory offers two types of utilities:

- Real time utilities, which must have a performance guarantee and predictable behavior:
  - periodic utilities: IOScanner and Global Data,
  - non-periodic utilities: Messaging on port 502 (UNI-TE, Modbus).
- Non real time utilities: Web utilities and network management utilities

Once the I/O Scanner and Global Data utilities have been configured, it is possible to estimate the load percentage of the module for each of these utilities.
The Bandwidth Monitoring function carries out this estimation during configuration. In online mode, it shows the actual distribution of the utilities (on the module diagnostics screen as well as on the Diagnostic Services "Bandwidth Monitoring" website).

Operation

In order to estimate this load, the Unity Proware asks you to complete two pieces of information during configuration (see ***p. 236***).

- an estimation of the number of messaging transactions per second,
- the PLC cycle time.

Using this information, the software is able to display:

- the load percentage of the module for the IOScanner,
- the load percentage of the module for the Global Data,
- the load percentage of the module for the messaging services,
- the load percentage of the module for the remaining non real-time utilities,

Note: During the configuration phase, these pieces of information are only estimates. The actual distribution is displayed in online mode.

4.11 ETHWAY Facility

ETHWAY Profile

At a Glance

The ETHWAY profile offers the following data exchange facilities:
- data exchanges synchronized on the MAST task,
- or data exchanges in:
  - asynchronous server mode,
  - asynchronous client mode.
- or common data exchanges (common words).

Only common data exchanges will be described below. For a description of synchronous and asynchronous exchanges, additional explanations are given in the section UNI-TE on TCP/IP (see ***p. 68***).

Common Words

All common words represent a database distributed amongst all or part of the devices on the same network.

Depending on the number of stations issuing common words on the network, there can be a maximum of:
- 4 common words per station for 64 active stations,
- 8 common words per station for 32 active stations,
- 16 common words per station for 16 active stations,
- 32 common words per station for 8 active stations,
- 64 common words per station for 4 active stations.

Note: The common words facility can in itself take up a large part of the module's messaging bandwidth if there are many stations connected and if the configured PLC cycle time is very short. In fact, common words are issued on each PLC cycle if there are changes in status and every 10 cycles if their value is not changed. You must therefore ensure not to exceed the maximum capacity of the module.

Updating of common words (%NW) is done automatically. The application program simply involves writing or reading these words.
Examples
- %NW{1.7}0:= %MW10 (writing a value for sending)
- %MW50:=%N{1.8}2 (receiving a value)

Configuration Parameters

5

Introduction

This chapter introduces the configuration parameters for the different facilities used by the modules.

What's in this Chapter?

This chapter contains the following sections:

Section	Topic	Page
5.1	Configuration Parameters for TCP/IP Facilities	122
5.2	Configuration Parameters for the IO Scanning Facility	130
5.3	Configuration Parameters for the Address Server Utility	135
5.4	Configuration Parameters for the SNMP Facility	138
5.5	Configuration Parameters of the Global Data Utility	142
5.6	Configuration Parameters of the Time Synchronization Service	146
5.7	Configuration Parameters of the Electronic Mail Notification Service	152
5.8	ETHWAY Profile Configuration Paramaters	155

5.1 Configuration Parameters for TCP/IP Facilities

Introduction

This section introduces the configuration parameters linked to the TCP/IP facility.

What's in this Section?

This section contains the following topics:

Topic	Page
Configuration Parameters Linked to TCP/IP Utilities	123
Configuration Parameters for IP Addresses	124
Example: Changing IP Parameters with SEND_REQ	126
Connection Configuration Parameters	127
Ethernet Configuration Parameters	129

Configuration Parameters Linked to TCP/IP Utilities

At a Glance

The TSX ETY modules of the Ethernet link of the TSX P57 4634/5634 have configuration parameters linked to TCP/IP services.
Depending on the Ethernet channel selected, some configuration parameters cannot be accessed on the configuration screen. They are either not shown on the screen or are grayed out.

Availability of Parameters

The following table shows, for each type of Ethernet channel, the parameters that can be accessed from the configuration screen and the values that they can have.

Parameters			**TSX ETY 110**	**TSX ETY 4103/PORT/ 5103**	**TSX P57 4634/5634**
X-Way Address			By thumb-wheels	By Unity Pro	Optional
IP Address	Default IP address		X	X	X
	Configured	IP Address	X	X (dynamic)	X
		Subnetwork mask	X	X (dynamic)	X
		Gateway address	X	X (dynamic)	X
	Client/Server configuration		-	X	X
Connections	Connections which can be opened		from 1 to 32	-	-
	Access control		X	X	X
	Correspondence table	X-Way Address	X	X	X
		IP Address	X	X	X
		Protocol	UNI-TE or Modbus	UNI-TE or Modbus	UNI-TE or Modbus
		Access	X	X	X
		Mode	-	Mono- or Multi-connections	Mono- or Multi-connections
Ethernet	Ethernet II		X	X	X
	802.3		X	X	X
Key:					
X	Accessible				
-	Not accessible				

Configuration Parameters for IP Addresses

At a Glance

This zone allows the IP address of a module to be defined in three distinct ways:
- either using a default configuration,
- by manual configuration,
- or by using a configuration supplied by a server device.

By Default

Selecting the **IP Address by default** field allows the module's IP address to be calculated from the code selectors (see ***p. 173***).
In this instance, you must code the network and station numbers on the code selectors located on the front of the module.
With this coding, the IP address is automatically derived by the system and the **IP Address**, **Subnetwork mask** and **Gateway Address** fields are not significant and are grayed out.

Note: The default parameters should not be selected when the module is connected to a closed or private network.

Configured

Selecting the **Configured** field allows manual configuration according to your own requirements:
- module IP address,
- the subnetwork mask, which defines the part allocated to the subnetwork identifier in the IP address,
- the IP address of the default gateway, to which messages for other networks are transmitted.

Note: If the module is connected to an existing TCP/IP network, the IP addresses are administered globally, therefore the IP parameters must be configured. Otherwise there is a risk of disturbance on the existing network caused by possible double allocation of the IP addresses.

Dynamic Modification

You can change the IP parameters (IP address, subnet mask, and default gateway) of the ETY module with the SEND_REQ function block. (Refer to the Unity Pro Communication Block Library documentation.) The dynamic Ethernet address function enables an ETY module (configured in a Unity 2.0-compatible PLC application) to dynamically assign itself new IP parameters.
The Premium ETY moduleís dynamic Ethernet address facility allows you to:

- install a single common PLC application into multiple physical installations, reducing the need for multiple copies of similar programs or rebuilding the application for each location that uses a new IP address
- use the PLC application code to assign an IP address and associated parameters to an ETY

To ensure that the ETY module is ready for operation, allow the PLC to run (in run mode) for 15 seconds after the last stop mode before issuing the SEND_REQ function. After the user issues the `CHANGE IP PARAMETERS` command and the ETY module accepts the new parameters, the ETY module resets and begins operations with the new parameters.

Note: FDR clients that use the ETY module for a server must be rebooted after the ETY's IP address change is completed. Otherwise, these FDR clients can not update their parameter files on the FDR server (the ETY module).

Note: Constant words contain the original configuration parameters, not those that were updated after the IP address change.

Note: You can see the new configuration (IP parameters, subnet mask, and gateway address) in the Unity Pro ETY debug screen (see ***p. 240***). You can also see the newly assigned IP address in the Ethernet Module Statistics web page (see ***p. 113***), however, you must be aware that the IP Address, Subnetwork mask, and Gateway data on this page reflect the old configuration.

Refer to the example for changing IP parameters with SEND-REQ (see ***p. 126***).

Client/Server Configuration

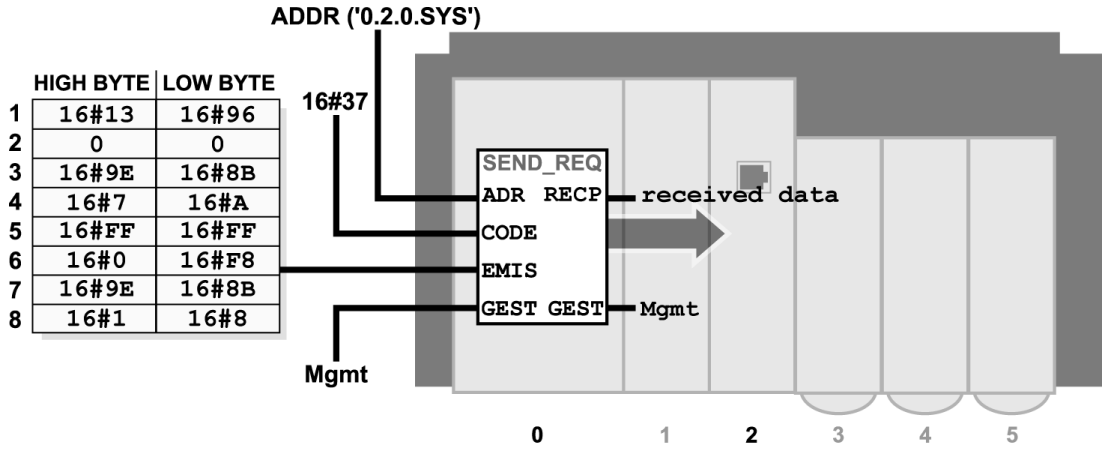
Selecting the **Client/Server configuration** field allows the module's IP address to be configured from a remote device acting as a BOOTP server (see ***p. 85***).

In this instance, the **IP address**, **Subnetwork mask** and **Gateway Address** fields are not significant and are grayed out.

Example: Changing IP Parameters with SEND_REQ

Illustration

The graphic shows you how to set IP parameters for the ETY module in slot 2 with the SEND_REQ block:



Note:

- ADR: reflects the ETYís position in slot 2.
- CODE: reflects the value of the REQUEST_CODE.
- EMIS: contains the IP parameters in Data_to_Send:
  - address (139.158.10.7)
  - subnet mask (255.255.248.0)
  - gateway (139.158.8.1)
- GEST: reflects Management_Param (management parameters).
  You have to assign a time to the third word of Management_Param. The fourth word should have the INT value 18.
- RECP: This parameter requires a minimum INT value of 1, even when no response message is returned, as in the case of an IP change request..

Connection Configuration Parameters

At a Glance

This field is used:
- to configure the number of connections that can be opened by the module,
- to activate an access control utility,
- to list the remote devices that can connect to the module according to a communication protocol.

Connections that Can be Opened

The **Connections which can be opened** field gives the maximum number of remote devices that can be connected in parallel onto the module:
- The default value is 8 connections.
- The value is between 1 and 32 connections.

Note: You are recommended to set this parameter to the useful value in order to optimize the communication resources for each connection point.

Access Control

The **Access control** box is used to activate (or not) control of the remote devices wishing to open a TCP connection towards the module.
- If the box is checked, access control management is activated and the **Access** column of the table is no longer grayed out (active).
  Where the module operates in server mode, only the remote devices selected by the **Access** box of the table are authorized to connect as clients and then to communicate.
- If the box is unchecked, access control management is inoperative and the **Access** column of the table is grayed out (not active).
  Where the module operates in server mode, remote third party devices can connects as clients and then communicate with the module without having to be declared in the table.

Note: Access control is only effective on the TCP/IP profile and favorable for operation of the module in server mode.

Correspondence Table

This table is used:

- to list the remote devices to which the local modules wishes to open a TCP connection and then transmit (module operating in client mode),
- to provide correspondence between the **X-Way** address {network, station} and the **IP address**,
  - the network number must be less than or equal to 127,
  - the station number is between 0 and 63 for a UNITE connection or between 100 and 163 for a Modbus connection.
- for each remote device of type TSX ETY 110 or TSX ETY 210, to specify the communication protocol during connection using a drop-down menu:
  - **UNI-TE** (default value),
  - **Modbus**,
- in the case of access control management, to designate the remote devices authorized to open a TCP connection and then to transmit to the local module (module operating in server mode),
- for each remote IP address, to choose the connection **mode** using a drop-down menu:
  - **Mono-connection**: the module only allows one connection with the same remote IP address,
  - **Multi-connection**: the module allows just one connection in client mode with the same remote IP address and several connections in server mode with the same remote IP address.

X-Way Profile

This field is specific to the TSX P57 5634 and allows you to choose whether or not to use an X-Way profile.
Check the box and complete the X-Way network/station address. If the X-Way profile has not been checked, the station cannot participate in X-Way exchanges. It may however be connected to Unity Pro or to Modbus applications.

Ethernet Configuration Parameters

Introduction

This field is used to define the format of the Ethernet frame via TCP/IP:

- the Ethernet II format: complying with the FRC 894 standard (the most commonly used),
- the 802.3 format: complying with the FRC 1042 standard. This format is to be selected if the remote devices use this format.

5.2 Configuration Parameters for the IO Scanning Facility

Introduction

This section introduces the configuration parameters linked to the I/O Scanning facility.

What's in this Section?

This section contains the following topics:

Topic	Page
Configuration Parameters Linked to the IO Scanning Utility	131
Configuring the General Parameters for the IO Scanning Utility	132
Configuration of Scanned Peripheral Devices	133

Configuration Parameters Linked to the I/O Scanning Utility

At a Glance

The TSX ETY4103/PORT/5103 modules and the Ethernet link of the TSX P57 5634 have configuration parameters linked to the I/O Scanning utility. These are given below.

List of Parameters

The following table gives the list of parameters to be configured for I/O Scanning.

		TSX ETY 4103/PORT/ 5103	**TSX P57 5634/4634**
Parameters			
Master %MW zones	Read Ref.	x	-
	Write Ref.	x	-
	Device Control Block	X	X
	Repetitive rate	in ms	in ms
	Master RD ref.	automatic	automatic
	Slave RD ref.	x	x
	Read Length	x	x
	Input fallback	Fallback to 0/Maintain	Fallback to 0/Maintain
	Master WR ref.	automatic	automatic
	Slave WR ref.	x	x
	WR Length	x	x
Legend:			
X	Accessible		
-	Not accessible		

Configuring the General Parameters for the I/O Scanning Utility

At a Glance

For configuring the IO Scanning utility, the read and write zones are general at the remote inputs/outputs:

Master %MW Zones

This sub-window is used to define the ranges of internal words of the application memory (%MW) specific to the read and write zones.

To do this, you must complete:
- for the read zone **Read Ref.**, the starting address in the table of internal words for reading inputs,
- for the write zone **Write Ref.**, the starting address in the table of internal words for writing outputs,

The length of tables has a maximum exchange capacity of:
- 2 Kwords for the read zone,
- 2 Kwords for the write zone.

Note: The tables must not overlap and an overrun check is made on global validation.

Configuration of Scanned Peripheral Devices

At a Glance

Scanned peripheral devices are configured in a table which is used:

- to list remote devices to be scanned, using the IP address,
- for each remote device, to specify the time out,
- to specify the scanning period allotted to it for each remote device,
- to configure, for each device, the amount of space the input and output words take up in the read and write zones,
- for each device, to set the output fallback mode.
- to add comments for each device.

The IP Address and Unit ID Fields

The **IP Address** field is used to list the devices which must be scanned by the Ethernet module.

The **Unit ID** field is used to associate the slave address of the device connected to an Ethernet/Modbus gateway with the IP address (see ***p. 71***).

- Values are from 0 to 255.
- The default value is 255.

Health Time Out

The **Health Time out** field is used to set the maximum time out for waiting for the response from the remote device. Beyond this time limit, the **Health bit** switches to 0.

Repetitive Rate

The **Repetitive rate** field is used to associate an IP address with its scanning period (see ***p. 83***).

The scanning time value is entered in ms.

Master RD Ref. and Master WR Ref.

These parameters give the addresses of the beginning of each range reserved for the device.

These parameters cannot be accessed. They are calculated automatically as the sum of:

- the address of the beginning of the **Read Ref.** table and the **Write Ref.** table,
- and the length of the **Read Length** and **Write Length** fields.

Example

The Ethernet module scans two devices:

- a Momentum at the address IP1, which has 4 input words.
- a Momentum at the address IP2, which has one input word.

Furthermore, the read field address starts at %MW100.

In this case, **master RD ref.** for the address IP1 equals 100. The internal word range reserved for the address IP1 starts at %MW100 and is made up of 4 words. Therefore, **master RD ref.** for the address IP2 equals 104. The internal word range reserved for the address IP2 starts at %MW104 (=%MW100 + 4 input words).

Slave RD Ref. and Slave WR Ref.

These fields correspond to the indices of the first word to be read and written for remote devices to be scanned.

- **slave RD ref.**: specifies the address of the first word to be read
- **slave WR ref.**: specifies the address of the first word to be written
- **Read Length** and **Write Length**

Input Fallback

This field is used to configure the behavior of inputs in the event of an access error in relation to the remote device (example: cut-off of the device, etc.) :

- Fallback to 0
- Maintain

Description

This field is not used by the module. It is only used to locate the device in the configuration more easily.
It has a maximum size of 32 characters.

5.3 Configuration Parameters for the Address Server Utility

At a Glance

This section describes the configuration parameters linked to the DHCP address server.

What's in this Section?

This section contains the following topics:

Topic	Page
Configuration Parameters Linked to the Address Server Utility	136
Configuration of the Address Server	137

Configuration Parameters Linked to the Address Server Utility

At a Glance

The TSX ETY4103/PORT/5103 modules and the Ethernet link of the TSX P57 5634 have configuration parameters linked to the address server utility.
These parameters are given below.

List of Parameters

The following table shows the parameters that can be accessed from the configuration screen and the values that they can have.

Parameters	
HTTP modification	Locked when executing
	Password
Client/server address table	

Configuration of the Address Server

At a Glance

Parameters linked to the address server are divided into 2 categories:
- rights to modify the utility via the HTTP server,
- the client/server address table.

HTTP Modification

This field is used to define the access rights to the address table via the HTTP server.

The access rights are configured by two parameters:
- the **Locked in operation** check box: which activates or deactivates access control to the table,
- the **Password** field: the table is accessed via the HTTP server by means of a password of no more than 8 ASCII characters.

Address Tables

The address table can be used:
- to list, by the MAC address or by their name (16 ASCII characters), the remote stations that need the DHCP server to start up,
- to provide a correspondence between the MAC address or the Name and the IP address of the remote station, the subnetwork mask and the Gateway.

5.4 Configuration Parameters for the SNMP Facility

Introduction

This section introduces the configuration parameters linked to the SNMP facility.

What's in this Section?

This section contains the following topics:

Topic	Page
Configuration Parameters Linked to the SNMP Utility	139
Configuration of the SNMP Utility	140

Configuration Parameters Linked to the SNMP Utility

At a Glance

The TSX ETY modules or the Ethernet link of the TSX P57 5634 have configuration parameters linked to the SNMP utility.

Depending on the Ethernet channel selected, some configuration parameters cannot be accessed on the configuration screen. They are either not shown on the screen or are grayed out.

Availability of Parameters

The following table shows, for each Ethernet module, the parameters that can be accessed from the configuration screen.

Parameters		**TSX ETY 110**	**TSX ETY 4103/PORT/5103 TSX P57 5634**
IP Address Managers		X	X
Agent	Location (SysLocation)	X	X
	Contact (SysContact)	X	X
	SNMP Manager	-	X
CommUnity Pro names	Set	X	X
	Get	X	X
	Trap	X	X
Security	Enable "Authentication Failure" trap	X	X
Legend:			
X	Accessible		
-	Not accessible		

Configuration of the SNMP Utility

At a Glance

Parameters linked to the SNMP utility are divided into 4 categories:
- the IP addresses of the SNMP utility administrative devices,
- the agents,
- the commUnity Pro names,
- security.

Note: Only 7-bit ASCII characters can be used in the character string entry fields.

Administrators' IP Addresses

This zone allows you to complete the SNMP administrators' IP addresses. The modules authorize a maximum of two administrators.

These addresses are used during possible transmission of events (TRAP).
See ***p. 89***.

Agent

This zone allows the localization and identification of an agent from the SNMP administrator.

It comprises two fields:
- The **Location (SysLocation)** field: indicates the physical location of the device (32 characters maximum).
- The **Contact (SysLocation)** field: indicates the person to contact for device management and the method of contact (strings of 32 characters maximum).
- It is preferable that this information is assigned by a "SNMP Manager" tool for network management, rather than by Unity Proware. To do this, check the **SNMP Manager** box.

CommUnity Pro Name

This zone is used to define a commUnity Pro name by utility family Set, Get and Trap.

It comprises three fields:

- The **Set** field defines the commUnity Pro name for the Set utility (strings of 16 characters maximum). The default value of the field is **Public**.
- The **Get** field defines the commUnity Pro name for the Get utility (strings of 16 characters maximum). The default value of the field is **Public**.
- The **Trap** field defines the commUnity Pro name for the Trap utility (strings of 16 characters maximum). The default value of the field is **Public**.

The purpose of these fields is to define the access rights for the MIB objects of the SNMP agent (local module) in relation to requests sent by the administrator.

Example
If the administrator sends a SetRequest request with the commUnity Pro name **Test** and the module has the commUnity Pro name **Public**, the request will not be executed.

Security

This zone contains the **Enable "Authentication Failure" trap** check box.

Checking this box allows you to validate the transmission of an authentication failure event (TRAP) from the SNMP agent to the administrator that originally posted the request.
In this way, the agent warns the administrator that the request has been refused following an identification error (commUnity Pro name configured in the administrator is different from the one configured in the agent).

CAUTION

Modifications to the SNMP parameters

The SNMP administrator is able to modify the value of certain configurable parameters (Enabling "Authentication failure", Location, Contact. etc.)
When there is a cold start, warm restart or application download, the values initially configured are then restored.

Failure to follow this precaution can result in injury or equipment damage.

5.5 Configuration Parameters of the Global Data Utility

At a Glance

This section introduces the configuration parameters linked to the Global Data utility.

What's in this Section?

This section contains the following topics:

Topic	Page
Configuration Parameters Linked to the Global Data Utility	143
Configuring the General Parameters for the Global Data utility	144
Configuration of the Variables Table	145

Configuration Parameters Linked to the Global Data Utility

At a Glance

The TSX ETY4103/PORT/5103 modules and the Ethernet link of the TSX P57 5634 have configuration parameters linked to the Global Data utility.

List of Parameters

Parameters	
Global Data configuration	Group address
	Group name
	Distribution Period
	Validity time out
	Multicast Filtering

Variables to be Published/ Subscribed

Association between Global Data variables (network variables) and application variables is carried out in the Unity Pro variable editor.
Each application variable published or subscribed (**ENet** field) in a Distribution Group (**Group** field) is link to a Global Data item (network variable).
Each Global Data item has a unique identification (**Data ID**) within a Distribution Group. The rank of the status bit in the HealthBit zone of Global Data corresponds to the identifier (**Data ID**) of the Global Data.

Properties

The following table provides the Global Data utility properties.

Type	**Value**
Max. number of publications	1
Size of a variable at publication	1 to 512 words
Max. number of subscriptions	64
Maximum variable size at subscription	Total of 2K words

Configuring the General Parameters for the Global Data Utility

At a Glance

The following parameters can be entered in the Global Data Configuration zone of the configuration (see ***p. 225***) screen:

- **Group address**
- **Group name**
- **Distribution period**
- **Health time out**
- **Multicast filtering**

Group Address

This zone is used to enter the multicast IP address (class D) for the group to which the station belongs. The value 239.255.255.255 is the default value.

Group Name

This field is used to fill in the group name associating a variable from the variable editor with a module.

Distribution Period

This zone is used to select the distribution period of the publication. The publication is synchronized with the PLC master task. The publication can be performed on each cycle of the Mast task (default value), or every n cycles of the Mast task.

Health Time Out

This zone is used to adjust the health "time-out" value.
An associated status bit (%IW zone) is linked to each Global Data item and is used to monitor whether the data has been published and received by the end of the time indicated in this window. If yes, the value is 1, otherwise the bit is set to 0.

Multicast Filtering

This check box activates multicast filtering.
This function is used to reduce data flow on large networks. Multicast filtering requires the use of switches that support this function (GMRP IEEE 802.1D protocol).

Configuration of the Variables Table

At a Glance

The Global Data variables table is configured in the Unity Pro data editor.
Three fields are specifically used for Global Data:

- **ENet**
- **Group**
- **Data ID**

Enet Field

This column enables you to choose the type of each variable:

- **NO**: variable that is neither published nor subscribed
- **PUB**: published variable
- **SUB**: subscribed variable

Group Field

The name of the Distribution Group to which the variable belongs is found in this column.

Data ID Field

The Global Data identifier in the same Distribution Group is found in this column (numbered from **1 to 64**).

5.6 Configuration Parameters of the Time Synchronization Service

At a Glance

This section introduces the configuration parameters linked to the time synchronization service, which uses the Network Time Protocol (NTP).

What's in this Section?

This section contains the following topics:

Topic	Page
Configuration Parameters Linked to the Time Synchronization Service (NTP)	147
Configuration of the Time Synchronization Service (NTP)	150

Configuration Parameters Linked to the Time Synchronization Service (NTP)

List of Parameters

Configure or change the following parameters on the NTP Configuration page.

1. IP address of primary NTP server
   - Enter a valid IP address
2. IP address of secondary NTP server
   - Enter a valid IP address
3. Polling Period (in seconds)
   Enter a value
   - min = 1sec
   - max = 120sec
   - default = 5 sec
4. Time Zone
   - Select from drop-down menu
     Universal Time, Coordinated (GMT) = default
   - Custom time zone
5. Automatically adjust clock for daylight saving change
   - Parameter is selected by default (check mark appears) if daylight saving time is chosen.

Time Zones Available

Select one from drop-down menu.

Time Zone	Description	DST Available
Custom		Yes
(GMT-12:00)	Dateline Standard Time [Eniwetok Kwajalein]	No
(GMT-11:00)	Samoa Standard Time [Midway Is Samoa]	No
(GMT-10:00)	Hawaiian Standard Time [Hawaii Honolulu]	No
(GMT-09:00)	Alaskan Standard Time [Anchorage]	Yes
(GMT-08:00)	Pacific Standard Time [Los Angeles Tijuana]	Yes
(GMT-07:00)	Mexican Standard Time [Chihuahua La Paz Mazatlan]	Yes
(GMT-07:00)	Mountain Standard Time [Arizona Phoenix]	No
(GMT-07:00)	Mountain Standard Time [Denver]	Yes
(GMT-06:00)	Central Standard Time [Chicago]	Yes
(GMT-06:00)	Mexico Standard Time [Tegucigalpa]	No
(GMT-06:00)	Canada Central Standard Time [Saskatchewan Regina]	No
(GMT-06:00)	Central America Standard Time [Mexico_city]	Yes
(GMT-05:00)	SA Pacific Standard Time [Bogota Lima Quito]	No
(GMT-05:00)	Eastern Standard Time [New York]	Yes

Time Zone	Description	DST Available
(GMT-05:00)	Eastern Standard Time [Indiana (East)] [Indianapolis]	No
(GMT-04:00)	SA Western Standard Time [Caracas La Paz]	No
(GMT-04:00)	Pacific SA Standard Time [Santiago]	Yes
(GMT-03:30)	Newfoundland Standard Time [Newfoundland St Johns]	Yes
(GMT-03:00)	E. South America Standard Time [Brasilia Sao_Paulo]	Yes
(GMT-03:00)	SA Eastern Standard Time [Buenos Aires Georgetown]	No
(GMT-02:00)	Mid-Atlantic Standard Time [South_Georgia]	No
(GMT-01:00)	Azores Standard Time [Azores Cape Verde Island]	Yes
(GMT)	Universal Coordinated Time [Casablanca, Monrovia]	No
(GMT0)	Greenwich Mean Time [Dublin Edinburgh Lisbon London]	Yes
(GMT+01:00)	Romance Standard Time [Amsterdam CopenHagen Madrid Paris Vilnius]	Yes
(GMT+01:00)	Central European Standard Time [Belgrade Sarajevo Skopje Sofija Zagreb]	Yes
(GMT+01:00)	Central Europe Standard Time [Bratislava Budapest Ljubljana Prague Warsaw]	Yes
(GMT+01:00)	W. Europe Standard Time [Brussels Berlin Bern Rome Stockholm Vienna]	Yes
(GMT+02:00)	GTB Standard Time [Athens Istanbul Minsk]	Yes
(GMT+02:00)	E. Europe Standard Time [Bucharest]	Yes
(GMT+02:00)	Egypt Standard Time [Cairo]	Yes
(GMT+02:00)	South Africa Standard Time [Johannesburg Harare Pretoria]	No
(GMT+02:00)	FLE Standard Time [Helsinki Riga Tallinn]	Yes
(GMT+02:00)	Israel Standard Time [Israel Jerusalem]	Yes
(GMT+03:00)	Arabic Standard Time [Baghdad]	Yes
(GMT+03:00)	Arab Standard Time [Kuwait Riyadh]	No
(GMT+03:00)	Russian Standard Time [Moscow St. Petersburg Volgograd]	Yes
(GMT+03:00)	E. Africa Standard Time [Nairobi]	No
(GMT+03:30)	Iran Standard Time [Tehran]	Yes
(GMT+04:00)	Arabian Standard Time [Abu Dhabi Muscat]	No
(GMT+04:00)	Caucasus Standard Time [Baku Tbilisi]	Yes
(GMT+04:00)	Afghanistan Standard Time [Kabul]	No
(GMT+05:00)	Ekaterinburg Standard Time [Ekaterinburg]	Yes
(GMT+05:00)	West Asia Standard Time [Islamabad Karachi Tashkent]	No

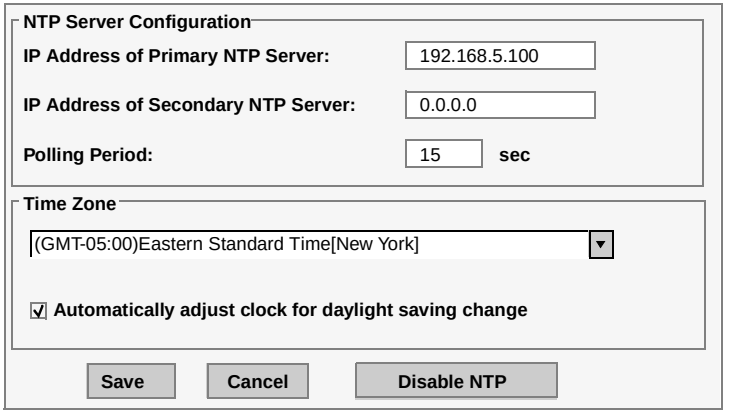
Time Zone	Description	DST Available
(GMT+05:30)	India Standard Time [Bombay Calcutta Madras New Delhi]	No
(GMT+06:00)	Central Asia Standard Time [Almaty Dhaka]	Yes
(GMT+06:00)	Sri Lanka Standard Time [Columbo]	No
(GMT+07:00)	SE Asia Standard Time [Bangkok Hanoi Jakarta]	No
(GMT+08:00)	China Standard Time [Beijing Chongqing Hong Kong Urumqi]	No
(GMT+08:00)	W. Australia Standard Time [Perth]	No
(GMT+08:00)	Singapore Standard Time [Singapore]	No
(GMT+08:00)	Taipei Standard Time [Taipei]	No
(GMT+09:00)	Tokyo Standard Time [Osako Sapporo Tokyo]	No
(GMT+09:00)	Korea Standard Time [Seoul]	No
(GMT+09:00)	Yakutsk Standard Time [Yakutsk]	Yes
(GMT+09:30)	Cen. Australia Standard Time [Adelaide]	Yes
(GMT+09:30)	AUS Central Standard Time [Darwin]	No
(GMT+10:00)	E. Australia Standard Time [Brisbane]	No
(GMT+10:00)	AUS Eastern Standard Time [Canberra Melbourne Sydney]	Yes
(GMT+10:00)	West Pacific Standard Time [Guam Port Moresby]	No
(GMT+10:00)	Tasmania Standard Time [Hobart]	Yes
(GMT+10:00)	Vladivostok Standard Time [Vladivostok]	Yes
(GMT+11:00)	Central Pacific Standard Time [Magadan Solomon Is New Caledonia]	Yes
(GMT+12:00)	New Zealand Standard Time [Auckland Wellington]	Yes
(GMT+12:00)	Fiji Standard Time [Fiji Kamchatka Marshall Is]	No

Configuration of the Time Synchronization Service (NTP)

Configuring the Time Service with the NTP Configuration Page

You must use the moduleís embedded Web page to configure the time service. No other method is available.

NTP Configuration



Time Service Command Buttons

Execute the following commands

Command Button	Description
Save	Stores new NTP (time service) configuration. Previous configuration is no longer valid.
Cancel	Cancels new NTP (time service) configuration. Previous configuration is valid.
Disable NTP	IP of Primary and Standby set = 0. NTP server not polled Time in controller not updated.

Changing Time Service Parameters

To make any changes to the time synchronization service,

Step	Action
1	Enter changes in the appropriate field on the NTP Configuration page for one or all of the configurable parameters.
2	Click Save.

Important Information about the Time Service

Note: About the Time Service

1. Enable/Disable Daylight Savings Time parameter
   If the Enable/Disable check box is selected, the module automatically corrects the local time to account for daylight savings time. Therefore, requiring no action, as the daylight savings time start and end are automatically changed each year.
2. Polling Time Parameter
   The time (in seconds) is the time between time updates from the NTP server. The default is 5 Seconds.
3. Storing the Time Service Configuration
   The last time service configuration is saved internally in the Ethernet module.
4. Replacing the Ethernet Module
   If the Ethernet module has to be replaced, the stored configuration is lost, and the system returns to the default configuration.

Customizing Time Zone Parameters

If you want a time zone not listed in the time zone table,

Step	Action	Comment
1	Write the text rules for the custom time zone.	
2	Using an FTP client, store your rules in the file: /FLASH0/wwwroot/conf/NTP/customrules user ID: ntpupdate password: ntpupdate	Root directory to store 'customrules' is set by the FTP server as /FLASH0/wwwroot/conf/NTP
3	When the rules are written, choose the drop down menu on the NTP Configuration web page, and configure (or reboot) the module by selecting Time Zone = Custom	The NTP component looks for customrules, calls the tz compiler and generates a new file called 'tz_custom'. This file is binary file and should not be edited. If the tz compiler detects a syntax error in customrules, the error is logged in the file: /FLASH0/wwwroot/conf/NTP/error.log **1.** NTP component is not launched **2.** NTP Status field in diagnostic web page displays NOT OK.
4	If you want more information, the syntax to write those rules along with a few examples are found in the module in /FLASH0/wwwroot/conf/NTP/instructions.txt	

5.7 Configuration Parameters of the Electronic Mail Notification Service

At a Glance

This section introduces the configuration parameters linked to the electronic mail notification service, which uses SMTP.

What's in this Section?

This section contains the following topics:

Topic	Page
Configuration Parameters Linked to the Electronic Mail Notification Service (SMTP)	153
Configuration of the Electronic Mail Notification Service (SMTP)	154

Configuration Parameters Linked to the Electronic Mail Notification Service (SMTP)

Configurable Mail Service Parameters

Configure the following parameters.

Parameter	Description
IP address of Email	Enter a valid IP address This parameter identifies SMTP server.
Port	Default = 25 If needed, enter a new value.

Password Authentication	If security is needed, enable Password Authentication.
	To enable, enter a check mark in the box.
	Enter values for
	● Login
	  ● Any printable character allowed
	  ● 12 character maximum
	● Password
	  ● Any printable character allowed
	  ● 12 character maximum

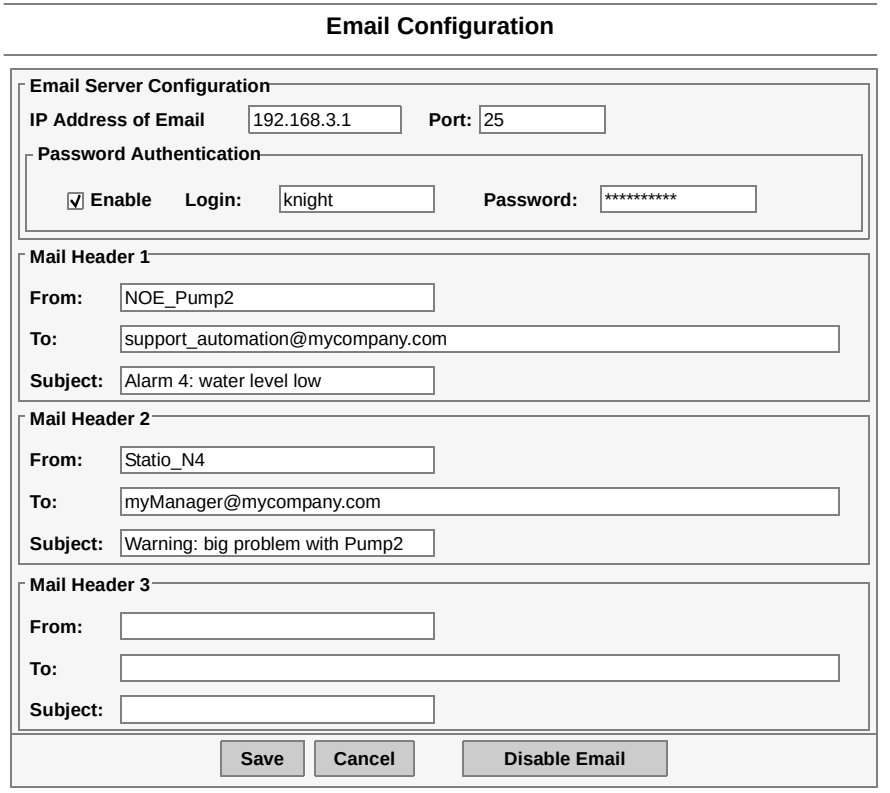
3 mail headers	Each header must contain
	1. senderís ID in the "From:" field
	  ● 32 character maximum; no spaces
	2. list of recipients in the "To:" field
	  ● Separate each email address with a comma.
	  ● 128 character maximum
	3. fixed part of message in the "Subject:" field[1.]
	  ● (32 character maximum)

1. Subject field consists of two parts:
1. Fixed
  ● 32 character maximum
2. Dynamic
  ● 206 character maximum	

Configuration of the Electronic Mail Notification Service (SMTP)

Configuring the Mail Service with the Email Configuration Page

You must use the moduleís embedded Web page to configure the electronic mail notification service. No other method is available.



Mail Service Command Buttons

Mail service configuration buttons

Command Button	Description
Save	Saves the new Email configuration. Note: Previous configuration is not valid. Previous configuration is not stored.
Cancel	Cancels the entries in the fields. Previous configuration is valid.
Disable Email	Clears the stored configuration, and disables the email service. Note: Next time the service is enabled, a new configuration is required.

5.8 ETHWAY Profile Configuration Paramaters

Introduction

This section introduces the configuration parameters linked to the ETHWAY profile.

What's in this Section?

This section contains the following topics:

Topic	Page
Configuration Parameters Linked to the ETHWAY Profile	156
Configuration of ETHWAY Data	157

Configuration Parameters Linked to the ETHWAY Profile

At a Glance

The TSX ETY110 modules have configuration parameters linked to the ETHWAY profile.
These parameters are listed below.

List of Parameters

The following table shows the parameters that can be accessed from the configuration screen and the values that they can have.

Parameters		
ETHWAY data (common words)	None	
	Common read words	
	Common read/write words	
	Word size/station	4
		8
		16
		32
		64
	Network address	

Configuration of ETHWAY Data

Introduction

The ETHWAY data parameters are used to configure the common words by:
- selecting the type of service supported,
- the number of words allocated per station,
- the network address of the local station.

None

The selection of this field invalidates the management of common words in the application.
The module does not manage the common database.

Common Reading words

The application has read only access to the common words.

Common Reading /Writing Words

The application has read and write access to the common words.

Size of Words/ Station

This field can be accessed when selecting **Common reading words** or **Common reading/writing words**.

Filling in this field configures the number of common words managed by the local module.

Note: The size of common words must be the same for each network station.

Network Address

This field can be accessed when selecting **Common reading words** or **Common reading/writing words**.

Filling in this field identifies the network which supports the common words service.

Method for Programming an Ethernet Network

6

Introduction

This chapter describes the method for creating an Ethernet network on Premium PLCs.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Configuration Methodology for an Ethernet Network	160
Choosing a Logic Network Family	165

Configuration Methodology for an Ethernet Network

Introduction

Creation and configuration of an Ethernet network involves 4 major stages:
- creation of an Ethernet logic network
- configuration of an Ethernet logic network
- declaration of the module
- association of the module with the logic network.

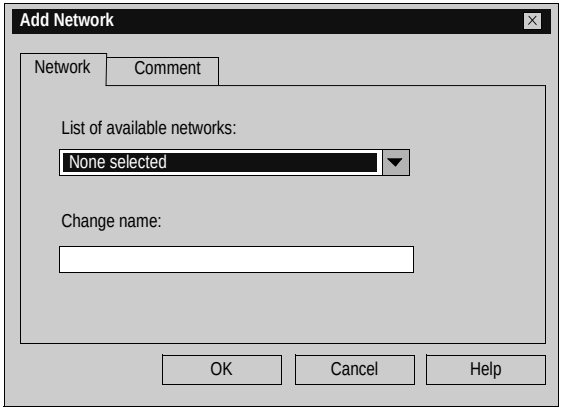
These four stages are described in the remainder of this documentation for an Ethernet TSX ETY 4103 module. These stages are also necessary for the Ethernet channels integrated in the processors.

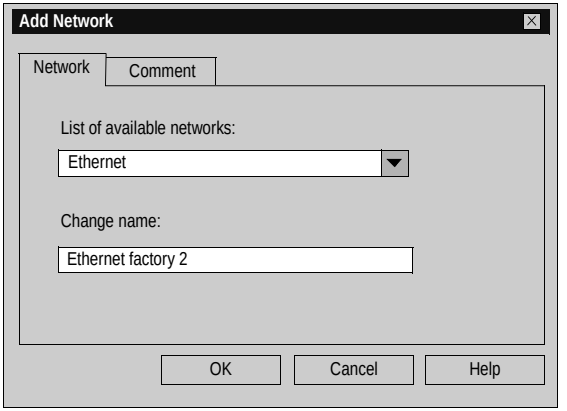
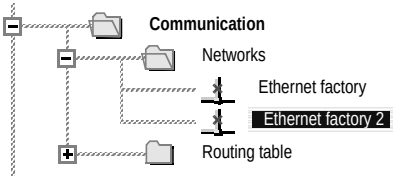
Note: the benefit of this method is that from the second step onwards, you can design your communication application (you do not have to have the hardware to start working) and use the simulator to test its operation.

Note: the first two phases are run from the project browser and the next two from the hardware configuration editor.

How to Create a Logical Ethernet Network

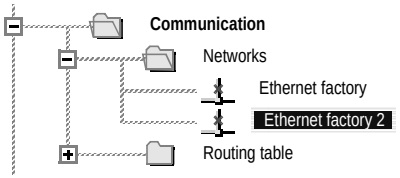
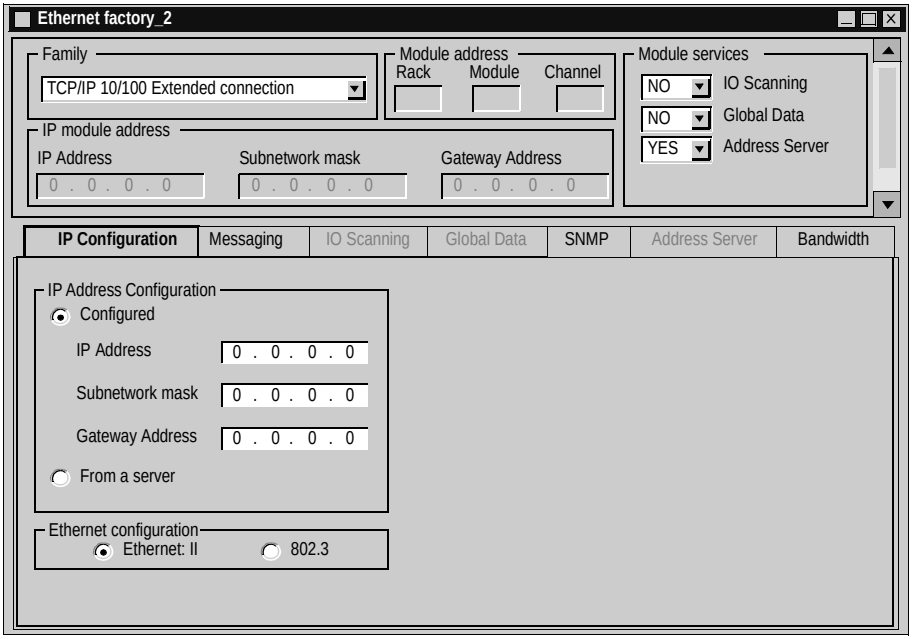
The following table introduces the procedure to follow for creating a logical Ethernet network:

Step	Action
1	With the right mouse button click the **Network** subdirectory of the **Communication** directory of the Project browser and select the**Add Network** option. **Result** : 

Step	Action
2	Choose **Ethernet** in the list of available networks and choose a meaningful name for your selection. **Result** :  **Note** : if desired, a comment may be added by clicking on the **Comment** tab.
3	Click **OK**, and a new logic network is created. **Result**: we have just created the Ethernet network that appears in the project browser.  **Note** : as you can see, a small icon indicates that the logic network is not associated with a PLC device.

How to Access Logical Ethernet Network Configuration

The following table introduces the procedure to follow for accessing the logical Ethernet network configuration:

Step	Action
1	Open the project browser in order to see the logic networks of your application. **Result** : 
2	Right click the Ethernet logic network to be configured and select **Open**. **Result**: the Ethernet configuration screen is displayed. 
3	Choose the model family of your network (to help you, a popup menu appears when you place your mouse over the selection menu). **Note** : The network can then be configured following the instructions given in the rest of this document by consulting the chapters describing the configuration procedures for each module type.

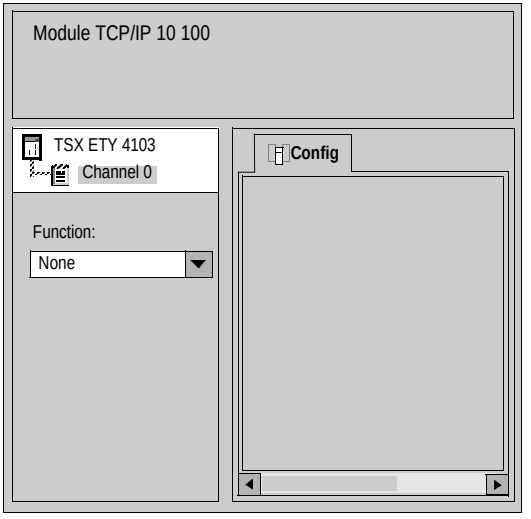
How to Declare the Module

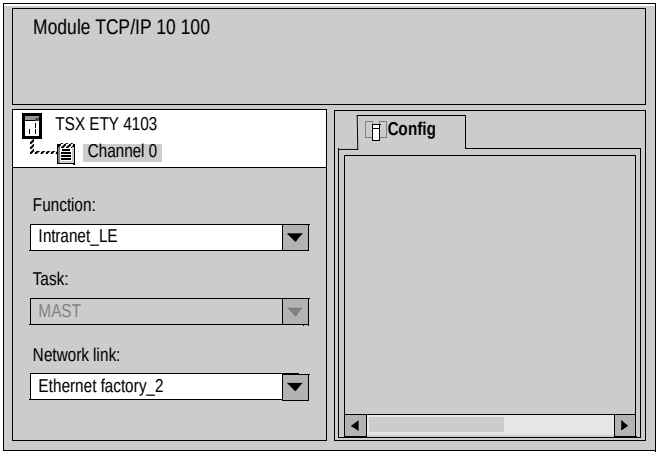
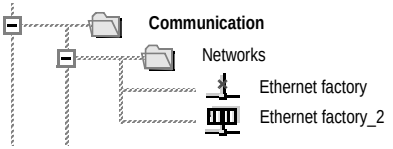
The following table describes the procedure for declaring an Ethernet module:

Step	Action
1	Open the hardware configuration editor.
2	Click twice on the empty slot in which you wish to place the module. **Result**: the module catalog window appears
3	Choose the **Communication** family.
4	Choose the desired Ethernet module from the list of **Communication** family modules. **Result**: the module appears in the rack. **Note** : in the case of Ethernet solutions integrated in the processors, the Ethernet communication channel is automatically declared when a processor is chosen.

How to Associate the Logic Network

The following table introduces the procedure to be followed to associate the logical Ethernet network with the module you have just declared:

Step	Action
1	Open the hardware configuration editor.
2	Click twice on the module slot. **Result:** 

Step	Action
3	In the **Function** zone, select the network to be associated with the card, then in the **Network link** zone, select the logic network you wish to associate with the Ethernet channel of the module. **Result:** 
4	Confirm your choice and close the window. **Result**: the **Ethernet factory_2** logic network is associated with the Ethernet TSX ETY 4103 module. The module address is written in the logic network's configuration window. The icon associated with this logic network changes and indicated the links with a PLC. 

Choosing a Logic Network Family

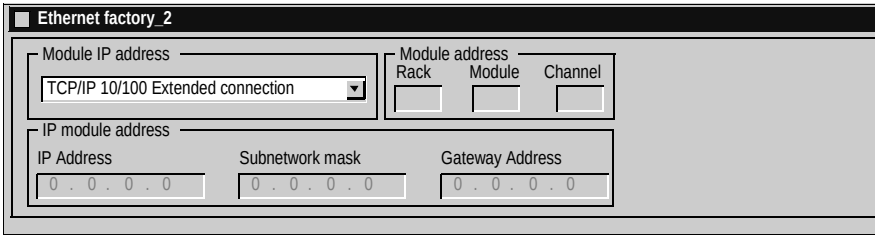
Introduction

Unlike other networks, during the configuration phase of an Ethernet logic network it is necessary to choose the module family to be attached to the logic network in order to be able to access the different services available.

There are three Premium PLC families:
- **TCP/IP 10 and ETHWAY** for ETY 110 and 110 WS,
- **TCP/IP 10/100 extended connection** for TSX P57 5634,
- **TCP/IP 10/100 standard connection** for ETY 4103, 5103 and PORT.

Figure

The figure below shows the family selection window.



TSX ETY 110 Module

7

Introduction

This chapter describes the implementation of a TSX ETY 110 module.

What's in this Chapter?

This chapter contains the following sections:

Section	Topic	Page
7.1	General Points	168
7.2	Configuration	174
7.3	Debugging	188

7.1 General Points

Introduction

This section introduces Ethernet communication from the TSX ETY 110 coupler and its characteristics.

What's in this Section?

This section contains the following topics:

Topic	Page
TSX ETY 110 Module : General	169
Characteristics	170
Performance	171
Operating Modes of the TSX ETY 110 Module	172
Common Functions on the ETHWAY and TCP/IP Profile	173

TSX ETY 110 Module : General

Introduction

The communication channel of the Ethernet TSX ETY 110 module offers two connection types :

- connection to an ETHWAY network with common word and X-Way UNI-TE messaging facilities on an ETHWAY profile,
- connection to a TCP/IP network with X-Way UNI-TE and Modbus messaging facility on a TCP/IP profile,

Because it functions as an SNMP agent, the module can be supervised by one or two SNMP managers.

Architecture Type

This module can be used in three different situations:

- in a closed proprietary ETHWAY architecture
- in a proprietary ETHWAY architecture connected to a TCP/IP network by an intermediate gateway
- in open TCP/IP architecture via direct connection to the network.

According to your choice of architecture, the recommended method of use is different (see ***p. 180***).

Note: When the Ethernet network load passes 30%, it is recommended that you use :

- the TCP/IP profile instead of the ETHWAY profile,
- switch type accessories, routers to reduce the load.

Characteristics

Messaging

The TSX ETY 110 module supports:
- maximum 32 parallel connections on TCP/IP,
- but only one connection to a remote device.

The maximum frame size depends on the type of transaction :
- In synchronous messaging, the maximum frame size is 256 bytes.
- In asynchronous messaging, the maximum frame size is 1 Kbyte.

The number of communication functions handled simultaneously depends on the type of profile:
- where a TCP/IP profile is used, maximum 16 simultaneous messages,
- where an ETHWAY profile is used, maximum 16 simultaneous messages.

Maximum Capacity of the Module

The module provides the following capacities:
- in the case of ETHWAY messaging : 130 messages per second,
- in the case of X-Way messaging on TCP/IP : 140 messages per second,
- in the case Modbus messaging on TCP/IP : 100 messages per second.

Note: A message can be:
- sending a communication function,
- the response to a communication function.

Common Words

A common word message is equivalent to 0.5 data messages.

Example of application dimensioning :
5 stations exchange common words every 100 ms and X-Way messaging on TCP/IP.
The flow of common words received by each module is 50 messages per second of common words, around 25 messages per second on TCP/IP.
So the remaining maximum capacity on each module on TCP-IP is:
140 ñ 25 + 115 messages per second

Performance

Example

The performance data below are given for a communication between two PLCs equipped with TSX 57-30 processors.

The values are expressed in ms and represent an average duration of the time described in the table.

Opening time of a TCP/IP connection	10 ms
Transaction time of a 128-byte UNI-TE request in periodic mode of 50 ms (MAST task)	150 ms
Transaction time of a 128-byte UNI-TE request in cyclic mode of 4 ms (MAST task)	80 ms
Transfer time of common words (out/in) in periodic mode 50 ms	250 ms
Module crossing time	15 to 30 ms

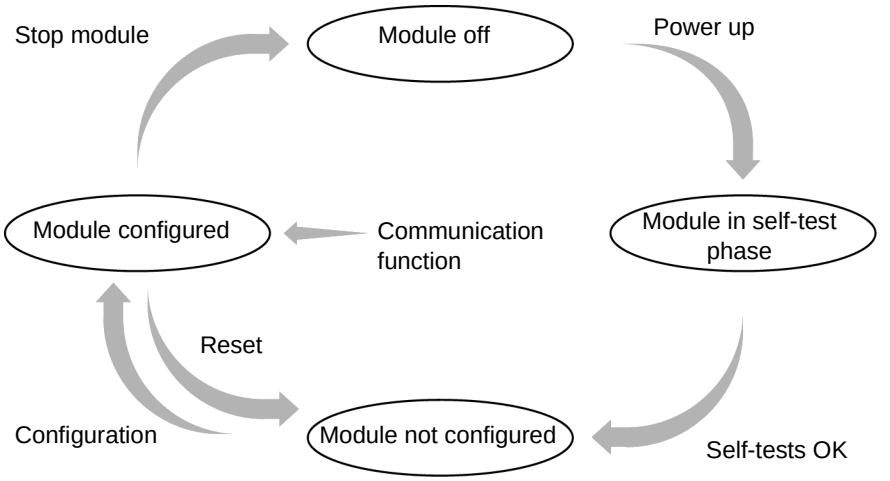
The transaction time takes into account the time to send the message and to receive the response.

Operating Modes of the TSX ETY 110 Module

At a Glance

The following diagram describes the operating modes of the TSX ETY 110 module.

General Diagram



Operation

- After power-up, the module carries out self-testing. During this phase, the LED indicators blink.
- The module does not operate with a default configuration. It must be sent this configuration by the Unity Pro application with a terminal connected to the terminal port of the PLC containing the module.
  The configuration values are given in the list of language objects %KW.
  The network, station address is given by the thumbwheels on the front panel.
- When the configuration is received, the module resets the current communication to zero before configuring itself (terminates current exchanges, shuts down TCP connections).

Common Functions on the ETHWAY and TCP/IP Profile

Duplicate MAC Address

Detecting a duplicate MAC address (defined by the code selector) between stations which have a Schneider MAC address is done when the device is switched on.

So that this detection is operational, the connection cable to the network must be plugged in before being switched on.

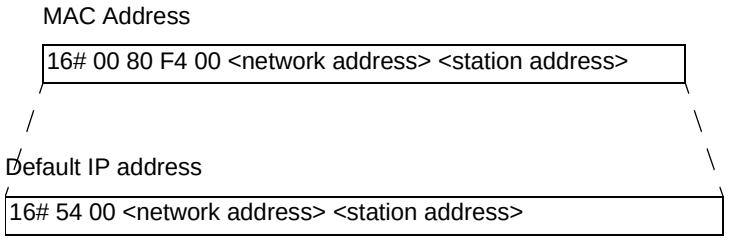
The RUN and ADR LEDs light up on the front panel of the module when a duplicate is detected.

Managing IP Parameters

In a closed architecture you may choose not to configure IP parameters and to keep the default values.

In an open TCP/IP architecture, the IP parameters (IP address, subnet mask, gateway address) must be configured.

The default value of the local IP address is derived from the MAC address (its uniqueness is not guaranteed in an open TCP/IP architecture). It is a class A IP address.



The default value of the subnet mask is 0.0.0.0 (no subnet knowledge).
The default value of the default gateway is 0.0.0.0 (no IP gateway knowledge).

7.2 Configuration

Introduction

This section describes the implementation of the TSX ETY 110 module during its configuration.

What's in this Section?

This section contains the following topics:

Topic	Page
Module Configuration Screen	175
Type of Communication According to Chosen Configuration	176
Configuration of Messaging on the TCP/IP Profile or the ETHWAY Profile	177
Configuration of the SNMP Utility	178
Configuration of the Bridge Function	179
Example of ETHWAY Private Type Architecture	180
Example of ETHWAY Type Architecture Connected to TCP/IP	182
Example of Connection to a Non-Private TCP/IP Network	184
Example of Communication between Premium and Quantum	186

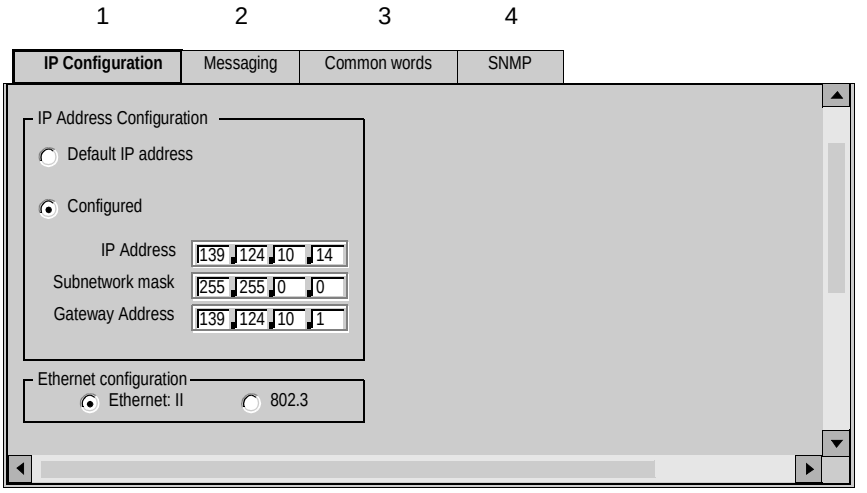
Module Configuration Screen

Introduction

This screen, separated into six zones, is used to declare the communication channel and to configure the necessary parameters for an Ethernet link.

Figure

The screen dedicated to Ethernet communication is displayed as follows:



Elements and Functions

This table describes the various zones that make up the configuration screen:

Tab	Function
1	Enables the configuration of IP addresses (see ***p. 124***) and configuration of the type of Ethernet frame (see ***p. 129***).
2	Enables the configuration of TCP/IP connections (see ***p. 127***).
3	Is used to configure common words.
4	Is used to configure the SNMP utility (see ***p. 140***.).

Type of Communication According to Chosen Configuration

Introduction

Depending on the configuration of the TSX ETY 110 module, you can carry out messaging :

- either on the ETHWAY profile,
- or on the TCP/IP profile.

Module in Client Mode

When the module is the client, the ETHWAY or TCP/IP profile is fixed by the configuration of stations in the moduleís connection table.

The following table specifies which profile is used according to the configuration of the table.

	If the address of the remote station is Ö	
	referenced in the table	**not referenced in the table**
Communication profile	TCP/IP	ETHWAY

Note: If no station is recorded in the table, the communication profile is ETHWAY.

Module in Server Mode

When the module is the server, the ETHWAY or TCP/IP profile is fixed according to the client device :

- If the client transmits on the ETHWAY profile, the module responds on the ETHWAY profile.
- If the client transmits on the TCP/IP profile, the module responds on the TCP/IP profile.

Note: Where access control is activated, compatibility must be ensured between the client and serverís connection tables. If the clientís address is referenced in the serverís table, the client must communicate on the TCP/IP profile.

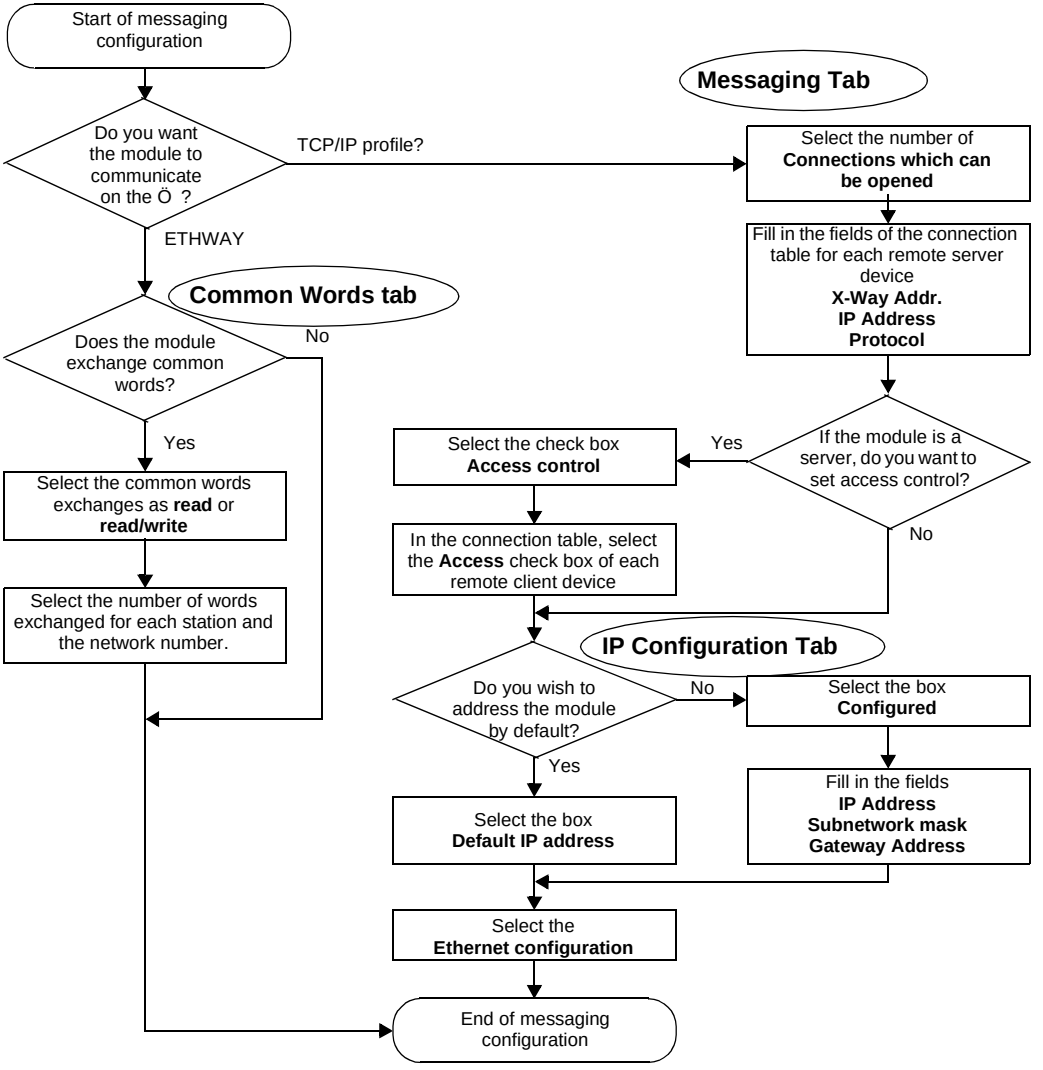
Configuration of Messaging on the TCP/IP Profile or the ETHWAY Profile

At a Glance

In order to use the TSX ETY 110 module to communicate on Ethernet, it is necessary to set the configuration parameters.

How to Configure the Module

Before configuring the module, access the configuration screen and click on the various tabs corresponding to your choices.


Start of messaging configuration
Do you want the module to communicate on the Ö ?
TCP/IP profile?
ETHWAY
Messaging Tab
Select the number of Connections which can be opened
Fill in the fields of the connection table for each remote server device
X-Way Addr.
IP Address
Protocol
Common Words tab
Does the module exchange common words?
No
Yes
Select the common words exchanges as read or read/write
Select the number of words exchanged for each station and the network number.
If the module is a server, do you want to set access control?
Yes
No
Select the check box Access control
In the connection table, select the Access check box of each remote client device
IP Configuration Tab
Do you wish to address the module by default?
No
Yes
Select the box Configured
Fill in the fields
IP Address
Subnetwork mask
Gateway Address
Select the box Default IP address
Select the Ethernet configuration
End of messaging configuration

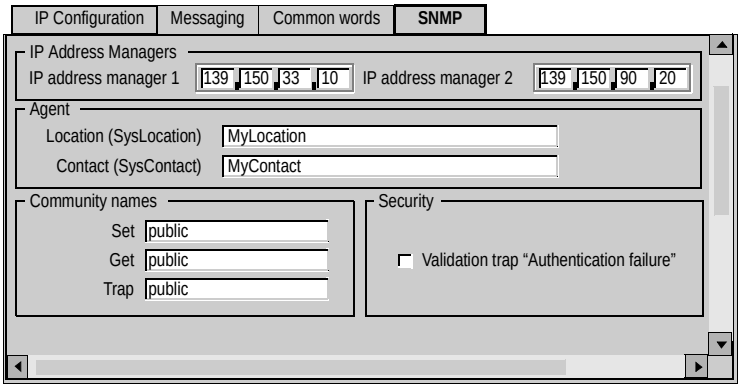
Configuration of the SNMP Utility

Introduction

In order to use the TSX ETY 110 module as an SNMP agent, it is necessary to set the configuration parameters of the SNMP utility.

How to Access the SNMP Utility

The procedure for accessing the configuration parameters for the SNMP utility is as follows.

Step	Action
1	Accessing the configuration screen module (Network directory of the Project browser)..
2	Click on the **SNMP** tab. **Result:** The following window appears 

How to Configure SNMP

The procedure for configuring the SNMP utility is as follows.

Step	Action
1	Enter the SNMP manager addresses: ● **Manager 1 IP addresses** ● **Manager 2 IP addresses**
2	Fill in the fields: ● **Location (SysLocation)** ● **Contact (SysLocation)**.
3	If you want to set access rights, fill in the commUnity Pro names: ● **Set** ● **Get** ● **Trap**
4	If you want to activate transmission of an event to the module, check the **Activate "Authentication Failure" trap** box.

Configuration of the Bridge Function

Introduction

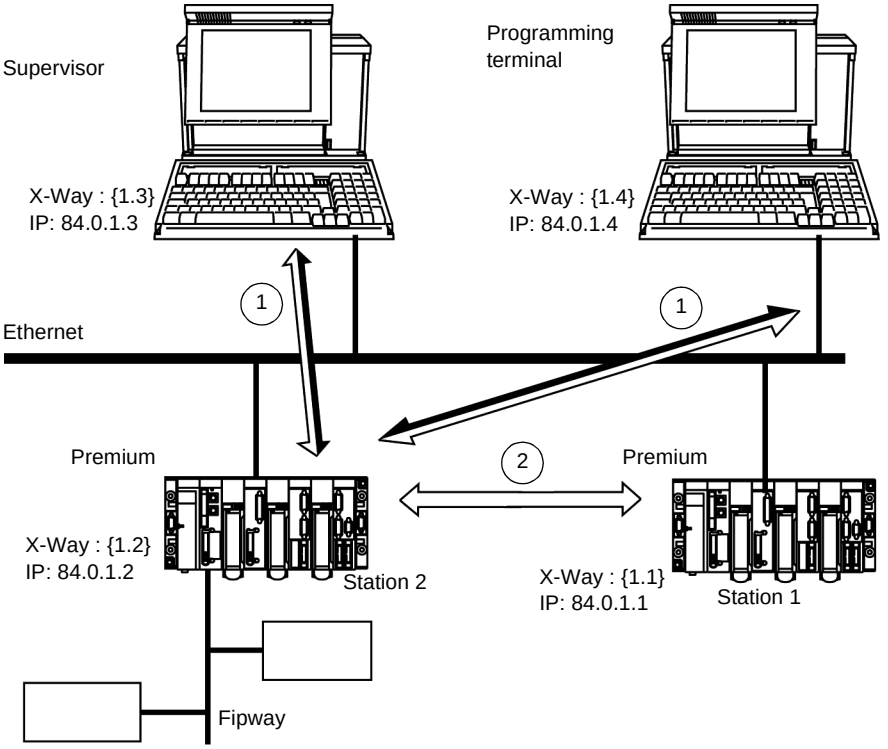
The TSX ETY 110 module can be used as an X-Way bridge station. This guarantees transparent communication between various networks.

Note: For installation of this function .

Example of ETHWAY Private Type Architecture

At a Glance

The following figure shows the installation of a TSX ETY 110 module in an ETHWAY private architecture.



1 ETHWAY or TCP/IP communication

2 ETHWAY communication

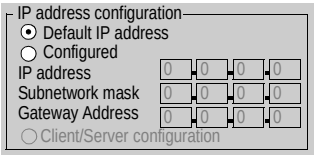
Recommended Operating Mode

- IP addressing is not managed (default value). It is taken from the values displayed on the thumbwheels of the module.
- Inter-PLC communication uses the ETHWAY utilities (COM, UNI-TE).
- Communication between the PLC and the supervisor or the programming terminal uses ETHWAY utilities or UNI-TE on TCP/IP.
- The frame format used is Ethernet II.

Note: In the following examples, it is assumed that the communication with the terminals is done on TCP/IP.

Configuration of the Local Address of the Module of Station 2

In a closed environment, it is possible to not manage the IP addresses, the **Default IP address** mode is selected.



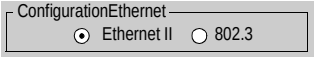
Configuration of the Connections of the Module on Station 2

The field to be entered is the X-Way address of the remote stations with which dialog is to be established (X-Way address 1.3); the other fields are automatically initialized. Access protection is inhibited by default and the maximum number of connections is 32.

Note: Since the PLC is still the server vis-‡-vis the programming terminal, the latter does not have to be declared.

Ethernet Configuration of the Module on Station 2

The Ethernet frame format selected for TCP/IP is **Ethernet II** because, in the example, the terminals use this format.



Configuration of the Common Words of the Module of Station 2

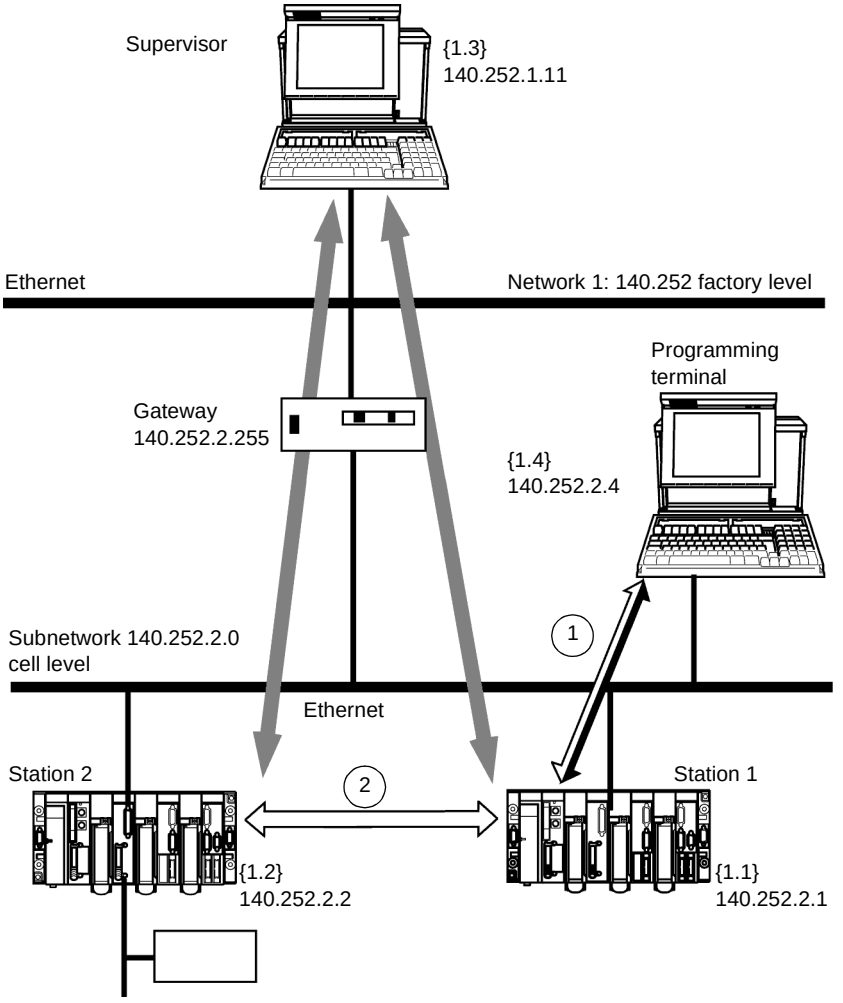
Station 2 exchanges 16 common write/read words with the other PLCs connected to the network.
The utility therefore requires configuration:

- of the type of utility,
- the size of common words,
- the network number.

Example of ETHWAY Type Architecture Connected to TCP/IP

At a Glance

The following figure shows the installation of a TSX ETY 110 module in an ETHWAY architecture connected to a TCP/IP network.



1 ETHWAY or TCP/IP communication

2 ETHWAY communication

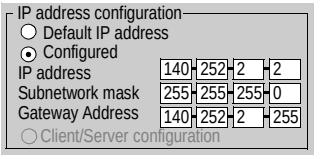
Recommended Operating Mode

- IP addressing is globally managed because connection is made to an existing TCP/IP factory network.
- At cell level, inter-PLC communication uses the ETHWAY utilities (COM, UNI-TE).
- Communication between the PLC and the supervisor or the programming terminal, at cell level, uses ETHWAY utilities or UNI-TE on TCP/IP.
- Communication between the PLC and the supervisor uses the UNI-TE utilities on TCP/IP.
- The frame format used is Ethernet II.

Note: Cell level ETHWAY utilities are the same as the utilities described in the previous example. This example only describes communication between the factory-level supervisor and a Premium PLC at cell level.

Configuration of the Local Address of the Module of Station 2

As the IP addresses must be managed, the configured IP address mode is selected.



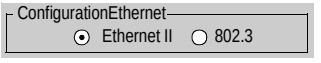
You must enter the IP parameters given above. These values are taken from the installation global addressing plan managed by the network manager.
The network manager can ensure their uniqueness by having their network ID (140.252) allocated by an authorized body.
The cell network is an IP subnetwork. This enables a unique network ID (140.252) to be allocated for the whole architecture. The subnetworks are then defined by the user of the subnetwork mask 255.255.0.0.
The address class chosen (in this case class B) depends on the number of machines and the number of installation networks.

Configuration of the Connections of the Module on Station 2

You must enter both the X-Way address and the IP address of the devices with which the module must communicate.
Click on the **Access control** button to activate this control, then check the corresponding box in the **Access** column.
The maximum number of connections in the application can be adjusted.

Ethernet Configuration of the Module on Station 2

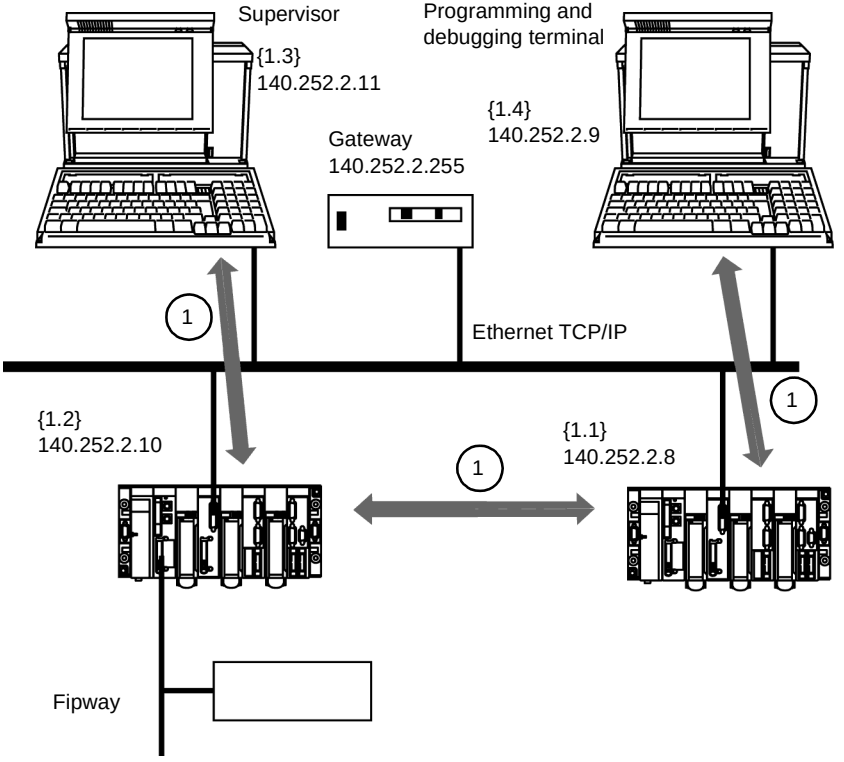
The Ethernet frame format selected for TCP/IP is **Ethernet II** because, in the example, the terminals use this format.



Example of Connection to a Non-Private TCP/IP Network

At a Glance

The following figure shows the installation of a TSX ETY 110 connected to an existing TCP/IP network.



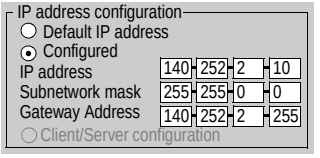
1 TCP/IP Communication

Recommended Operating Mode

- IP addressing must be managed because connection is made to a non-private TCP/IP network.
- Inter-PLC communication uses the UNI-TE utilities on TCP/IP.
- Communication between the PLC and the supervisor or the programming terminal uses UNI-TE utilities on TCP/IP.
- The frame format used is Ethernet II.

Configuration of the Local Address of the Module

The IP addresses must be managed, the **Configured IP address** mode is selected, you must enter the IP parameters.

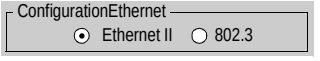


Configuration of the Connections of the Module

You must enter both the X-Way address and the IP address of the devices with which the module must communicate.
Click on the **Access control** button to activate this control, then check the corresponding box in the **Access** column.
The maximum number of connections which can be opened in the application can be adjusted.

Ethernet Configuration of the Module

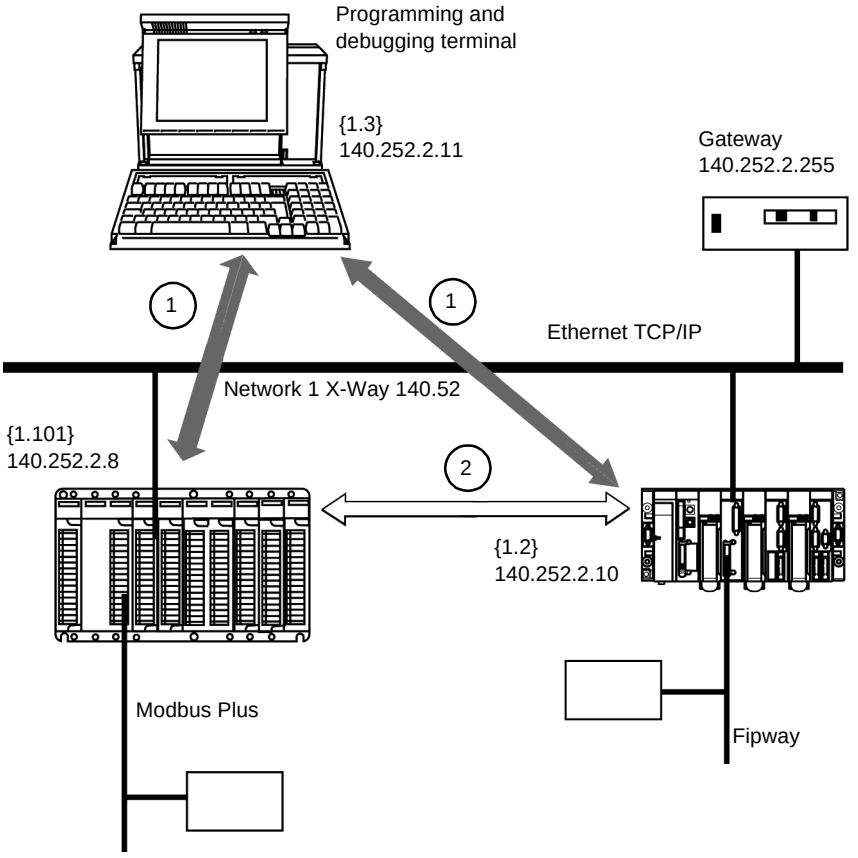
The Ethernet frame format selected for TCP/IP is **Ethernet II** because, in the example, the terminals use this format.



Example of Communication between Premium and Quantum

At a Glance

The following figure shows the installation of a TSX ETY 110 for communicating with a Quantum PLC.

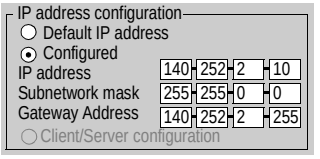


Recommended Operating Mode

- IP addressing is managed due to the risk of duplicating IP addresses with default values.
- Inter-PLC communication uses the Modbus utilities on TCP/IP.

Configuration of the Local Address of the Module

The IP addresses must be managed, the **Configured IP address** mode is selected, you must enter the IP parameters.



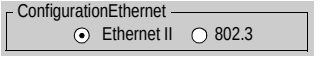
Configuration of the Connections of the Module

You must enter both the X-Way address and the IP address of the devices with which the module must communicate.
Click on the **Access control** button to activate this control, then check the corresponding box in the **Access** column.
The maximum number of connections in the application can be adjusted.

Note: Communication with the Quantum PLC requires the Modbus protocol to be configured.

Ethernet Configuration of the Module

The Ethernet frame format selected for TCP/IP is **Ethernet II** because, in the example, the terminals use this format.



7.3 Debugging

Introduction

This section describes the debugging of the TSX ETY 110 module.

What's in this Section?

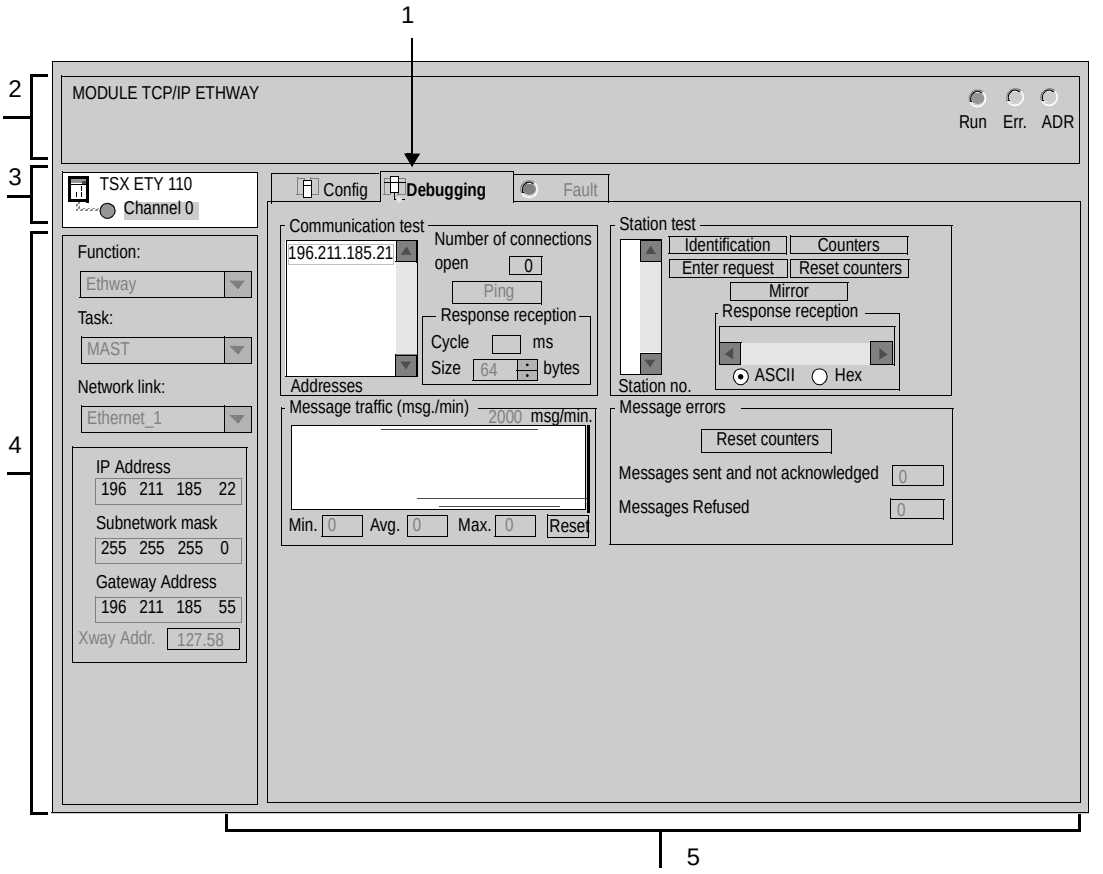
This section contains the following topics:

Topic	Page
Module Debugging Screen	189
General Debugging Parameters	191
Debugging Parameters for TCP/IP Utilities	192
How to Test TCP/IP Communication with a Ping Request	193
Debugging Parameters for Ethway Utilities	194
Requests Available for the Communication Channel Test	195
How to Test a Channel with Identification and Mirror Requests	196
How to Test a Channel with Requests	197

Module Debugging Screen

Introduction This screen, separated into five zones, allows debugging of an Ethernet link.

Figure The screen dedicated to Ethernet communication is displayed as follows:



Elements and Functions

This table describes the various zones that make up the configuration screen:

Number	Zone	Function
1	Tab	Debug tab
2	Module	Module description zone
3	Channel	Channel selection zone
4	General parameters	General parameters zone
5	General parameters	Debug zone containing the different parts described hereafter.
	Message traffic	allows the graphical display of the number of messages processed by the module:
	Message errors	allows the display of the number of unacknowledged or refused messages.
	Communication tests	allows: ● display of TCP/IP utilities configuration, ● communication testing of the TCP/IP profile.
	Station tests	allows: ● display of ETHWAY utilities configuration, ● communication testing of the ETHWAY profile.

General Debugging Parameters

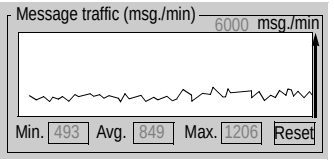
Introduction

The general debugging parameters are grouped into two windows :

- the **Message traffic** window,
- the **Message errors** window.

Message Traffic

The window looks like this :



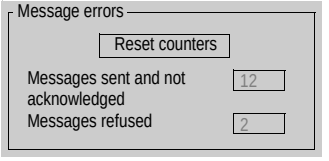
It shows graphically the number of messages per minute handled by the module (sending and receiving).

This number can be compared to the maximum flow rate offered by the module (7800 or 8400 messages of 128 bytes per minute) in order to determine whether the latter is working in a normal use range or in overload.

The **Reset** button resets to zero the three counters**Min.**,**Av.** and **Max.**.

Message Errors

The window looks like this :



The message errors window shows the number of unacknowledged messages on ETHWAY and the number of refused messages on ETHWAY or TC/IP.
You can reset these counters to zero by clicking on the **Init counters** button.

Debugging Parameters for TCP/IP Utilities

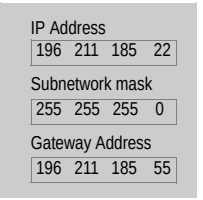
Introduction

The debugging parameters for the TCP/IP utilities are grouped together in two windows:

- the **IP Address** window,
- the **Communication test** window.

IP Address

The window is displayed as below:

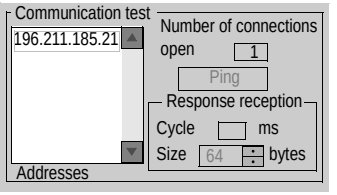


It specifies the configuration data of the IP address:

- **IP Address**
- **Subnetwork mask**
- **Gateway Address**: address of the gateway

Communication Test

The window is displayed as below:



This window allows you to test IP communication towards another declared station in the remote devices grid.

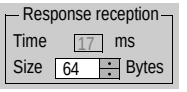
How to Test TCP/IP Communication with a Ping Request

Introduction

This page indicates the procedure to be followed to test a TCP/IP communication by means of a **Ping** request.

Steps to Follow

The following procedure allows the sending of the Ping request and thus tests the routing of information between two devices.

Step	Action
1	Select the address of the station to be interrogated with the help of the **Addresses** field.
2	Select the number of bytes to be transmitted using the **Size** field. This specifies the length of the message to be sent between 64 and 1472 bytes.
3	Press the button **Ping**. **Result** The reply appears in the field **Time** :  The time returned corresponds to the turnaround time for the message in ms.

Type of Response

The following table groups together the different types of response to the Ping request.

If the response isÖ	then Ö
positive	The window indicates the turnaround time for the message in ms.
negative	• a window with the message **Timeout** specifies the absence of response from the remote device. • a window with the message **Host unreachable** specifies that the remote device has not been reached in the network architecture.

Debugging Parameters for Ethway Utilities

Introduction

The debugging parameters for the TCP/IP utilities are grouped together in two windows:

- the **Station Address** window,
- the **Station test** window.

Station Address

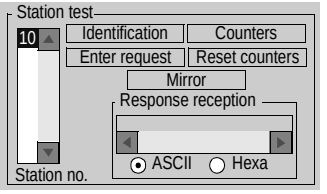
The window is displayed as below:

It recalls the configuration data:

- **Addr. X-Way** : X-Way address of the station

Station Test

The window is displayed as below:



This window is used to test a communication channel by sending a request to one of the stations present on the network.

Requests Available for the Communication Channel Test

Introduction

This page describes the different possibilities for testing a communication channel from the debugging screen.

Test Conditions

Sending a request to an unconnected station results in an error message.

Available Requests

Window **Test station** allows the following requests :

- **Identification** : prompts the Identification request to be sent to the designated remote station,
- **Counters** : prompts the sending of the request for the Reading of the error counters to the designated station,
- **Counters** : prompts the designated stationís error counters to be reset to zero,
- **Request input**: allows a UNI-TE request, other than those provided by the command buttons, to be sent to the designated station. The choices available in this function give access to a screen that allows you to select the parameters that are specific to the request (request code must be coded in hexadecimal),
- **Mirror**: allows a mirror request to be sent to the designated station. Selecting this function gives access to a screen that allows you to select the length of the character string to be sent (a maximum of 80 characters). The PLC then sends this character string (ABCDÖ .) to the destination device. This automatically sends the character string that was received back to the sender.

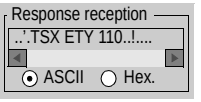
How to Test a Channel with Identification and Mirror Requests

Introduction

This page indicates the procedure to follow to test a communication channel by means of Identification and Mirror requests.

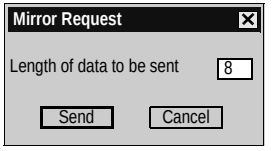
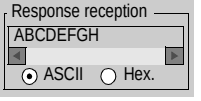
How to Identify a Station

The following procedure allows the identification of a designated station.

Step	Actions
1	Select the address of the station to be interrogated with the help of the field **Station**.
2	Click on the button **Identification**. **Result**: The response appears in the window **Receive Response** : 

How to Send the Mirror Request

The following procedure allows the sending of the Mirror request and thus tests the routing of information between two devices.

Step	Action
1	Select the address of the station to be interrogated with the help of the field **Station**.
2	Click on the button **Mirror**. **Result**: The following window appears : 
3	Input the length of data to be sent (maximum 80 characters).
4	Click on the button **Send**. **Result**: The response appears in the window **Receive Response**:  The response contains: ● the character string ABCDEFGH that corresponds to the length of data sent 8.

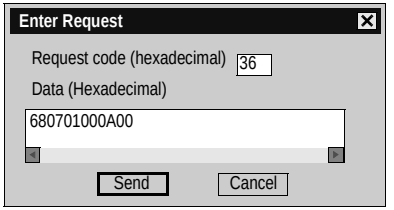
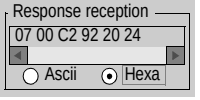
How to Test a Channel with Requests

Introduction

This page indicates the procedure to follow to test a communication channel from the debugging screen through different requests.

How to Send a Request

The following procedure allows a request, other than those provided by the command buttons, to be sent to a designated station. In this example, the request sent is used to read 10 words (from %MW1 to %MW10).

Step	Action
1	Select the address of the station to be interrogated with the help of the field **Station**.
2	Click on the button **Input Request**. **Result**: The following window appears :  The data sent in this example is coded on 6 bytes.
3	Input the function code (coded in hexadecimal on one byte), corresponding to the request that you want to send. For this example the read request code is 16#36.
4	Input the data to be sent by coding all the data in hexadecimal. The data is sent non-stop without any time intervals between them. When the data is coded on one word, the most significant and least significant bytes are reversed. For this example the data is as follows : ● 16#68 : on one byte, defines the segment (internal data), ● 16#07 : on one byte, defines the object type (words), ● 16#0100 : on one byte, defines the first word to read, ● 16#0A00 : on one byte, defines the number of words to read.
5	Click on the button **Send**. **Result**: The response appears in the **Receive Response** window :  The response from the example has data on 21 bytes. ● 16#07 : corresponds to object type (words), ● 16#00C2 : corresponds to the value of the first word (the most significant and least significant bytes are reversed, its value is 16#C200), ● ...

Modules TSX ETY 4103, TSX ETY PORT, TSX WMY 100 and TSX ETY 5103

8

Introduction

This chapter describes the installation of the modules **TSX ETY 4103, TSX ETY PORT , TSX WMY 100** and **TSX ETY 5103**.

What's in this Chapter?

This chapter contains the following sections:

Section	Topic	Page
8.1	General	200
8.2	Configuration	210
8.3	Debug	239

8.1 General

Introduction

This section introduces Ethernet communication from a **TSX ETY 4103, TSX ETY PORT, TSX WMY 100** or **TSX ETY 5103** module, and their properties.

What's in this Section?

This section contains the following topics:

Topic	Page
General	201
Characteristics	202
Type of Connections Supported	203
Performance of I/O Scanning Utility	205
Global Data Utility Performances	207
Operating Modes for the TSX ETY 4103, TSX ETY PORT and TSX ETY 5103 Modules	208

General

At a Glance

The communication channel of the Ethernet TSX ETY 4103/PORT/5103 module offers connection to a TCP/IP network supporting the UNI-TE and Modbus messaging utility on a TCP/IP profile.
The three modules, **TSX ETY 4103**, **TSX ETY PORT** and **TSX ETY 5103** also offer the following utilities:

- Thanks to their SNMP agent functionality, the modules can be supervised by one or two SNMP managers.
- They are able to perform the role of DHCP server or the BOOTP client.
- Because of its I/O Scanning facility, they can drive remote inputs/outputs on the Ethernet network.
- They integrate an embedded HTTP server.
- Thanks to the Global Data utility, the modules allow the exchange of data between IEC standard PLC stations.
- The Bandwidth monitoring utility, which allows the repair of the module utilities to be verified.
- The Replace faulty device utility, which allows the device configuration to be saved in the module. In case of breakdown, another installed blank module can be restarted with the configuration parameters of the previous one.
- Electronic Mail Notification Service, which sends alarms and events messages from controller to designated recipient.
- Time synchronization service, which updates controller clocks with Universal Time, Coordinated (UTC) from a referenced source.

In addition, the **TSX ETY 5103** module offers the option of creating user Web and TCP Open pages.

Characteristics

Maximum Capacity of the Module

The maximum frame size depends on the type of transaction:
- In synchronous messaging, the maximum frame size is 256 bytes.
- In asynchronous messaging, the maximum frame size is 1 Kbyte.

The modules TSX ETY 4103, TSX ETY PORT and TSX ETY5103 allow you:
- to manage 64 TCP connections using the port 502 messaging utility,
- to scan up to a maximum of 64 devices using the I/O Scanning utility,
- to be the DHCP server for a maximum of 96 devices requiring this utility,

In conjunction with a processor dedicated to this sort of handling, the module can be used:
- for X-Way synchronous messaging on TCP/IP (UNI-TE server):
  - with a TSX 57-454 processor: 800 messages per second,
  - with a TSX 57-354 processor: 490 messages per second,
- in the case of asynchronous X-Way messaging on TCP/IP:
  - between 600 and 1200 messages per second (number varies depending on the size of the messages, the number of clients and the time it takes to run the application).

I/O Scanning Utility

The module can scan a maximum of 64 remote devices.
For the same station, the application can process:
- a maximum total volume of inputs to be scanned of 2 Kwords,
- a maximum total volume of outputs to be scanned of 2 Kwords.

Note: Important: when using the I/O scanning utility, the PLC cycle is impacted by about 1 ms per volume of 512 I/O words scanned.

In the same way, the size of the application is impacted by 6 Kbytes for each configured TSX ETY 4103/PORT/5103 module.

Global Data Utility

The user interface is a %MW zone defined in configuration.
- Each module can issue a variable of between 1 and 512 words,
- Each module can subscribe from 1 to 64 variables. The total data cannot exceed 2Kwords.

Replace Faulty Equipment

The module reserves a 512 kbyte zone for this function.
- Up to 96 remote devices can be configured in the DHCP address server utility.
- The 96 remote devices must share the 512 kb reserved for their parameters.

Type of Connections Supported

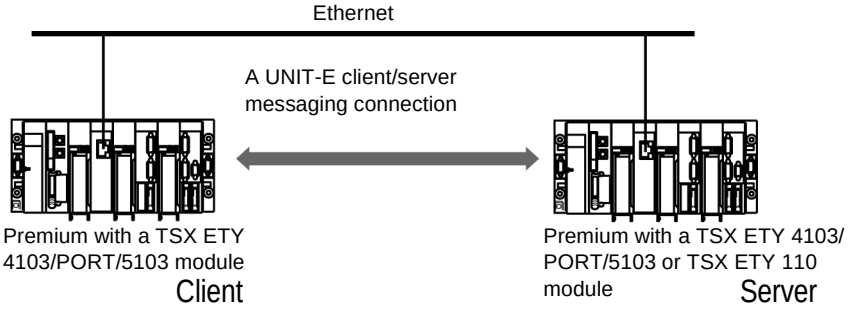
At a Glance

The TSX ETY 4103 or TSX ETY PORT modules authorize a maximum of 8 parallel HTTP connections (16 for the TSX ETY 5103 module).

The TSX ETY 4103/PORT/5103 modules authorize a maximum of 64 parallel connections on TCP/IP.

Connection to a Premium

Between two Premium PLCs using UNI-TE messaging on the TCP/IP profile, the TSX ETY 4103/PORT/5103 module only allows one connection in client/server mode.

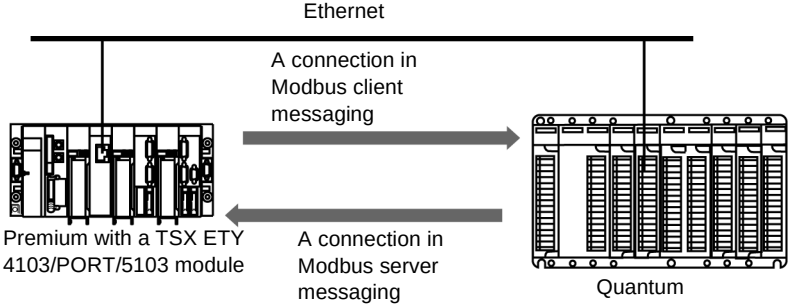

Ethernet
A UNIT-E client/server messaging connection
Premium with a TSX ETY 4103/PORT/5103 module
Client
Premium with a TSX ETY 4103/ PORT/5103 or TSX ETY 110 module
Server

Connection to a Quantum

Between a Premium PLC and a Quantum PLC using Modbus messaging on the TCP/IP profile, the TSX ETY 4103/PORT/5103 module allows:

- a single connection in Modbus client mode,
- a single connection in Modbus server mode.

Example

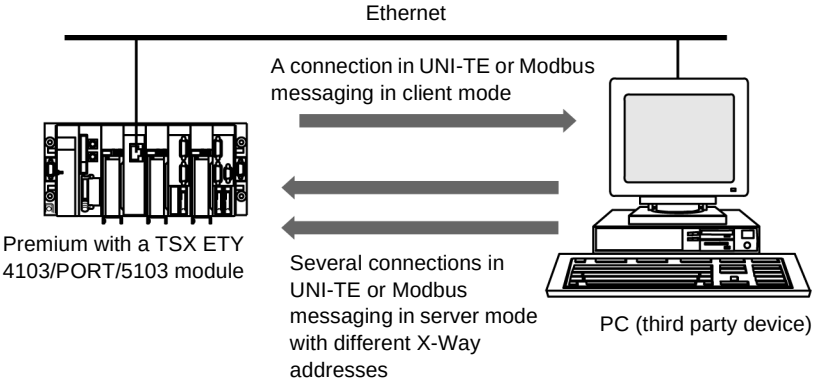

Ethernet
A connection in Modbus client messaging
Premium with a TSX ETY 4103/PORT/5103 module
A connection in Modbus server messaging
Quantum

Connection to a Third Party Device

Between a Premium PLC and a third party device, the TSX ETY 4103/PORT/5103 module allows:

- a single connection in UNI-TE or Modbus client mode,
- several connections in UNI-TE or Modbus server mode.

Example


Ethernet
A connection in UNI-TE or Modbus messaging in client mode
Premium with a TSX ETY 4103/PORT/5103 module
Several connections in UNI-TE or Modbus messaging in server mode with different X-Way addresses
PC (third party device)

Performance of I/O Scanning Utility

At a Glance

The performance data presented below are those of the module TSX ETY 4103/ PORT/5103 while using the I/O Scanning utility.

Restart Time for an I/O Scanning Configuration

This time corresponds to the time between the power up of the complete configuration and the moment when all the remote inputs/outputs become operational (the status bits are activated, the word bits %IWr.M.c.1 to %IWr.m.c.4 = 1).
Values are given in seconds:

- T= 35 s, if the TSX ETY 4103/PORT/5103 module is used as a BOOTP server to connect the scanned devices.
- T = 17 s, if the scanned devices use another BOOTP/DHCP server.

Input/Output Restart Time

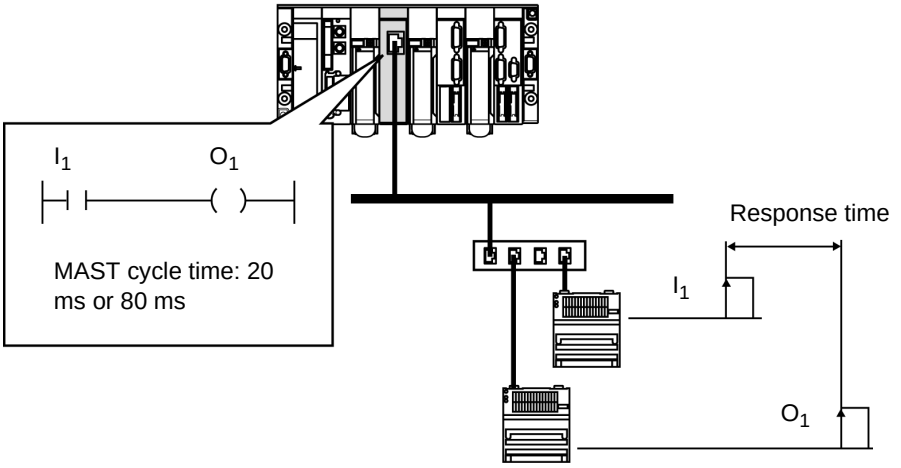
This time corresponds to the time between the power up of the remote input/output and the moment when all the status bits are activated (word bits %IWxy.i.l to %IWxy.i.4 = 1).
The value is given in seconds:

- T = 5 s

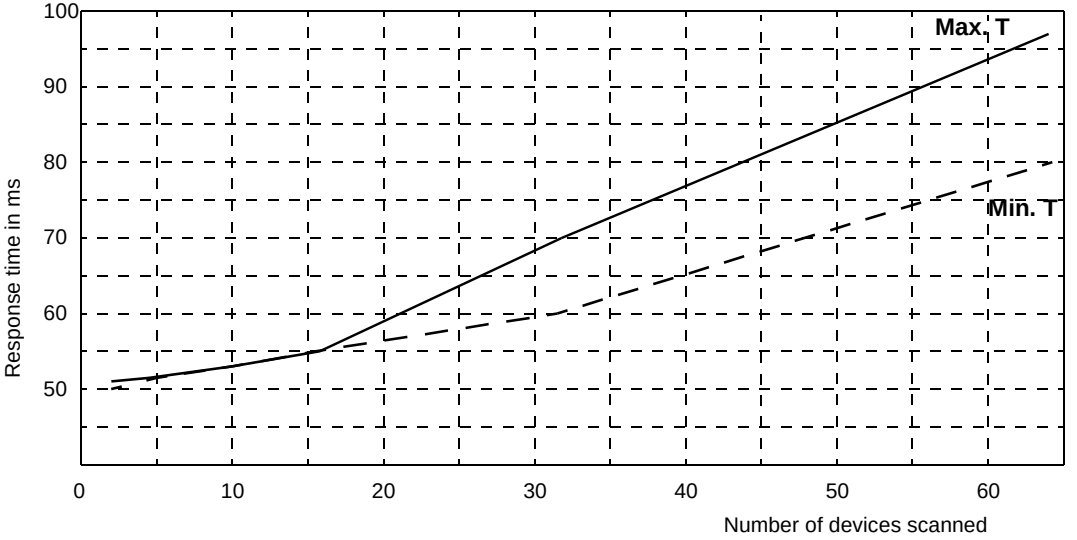
Application Response Time

This time corresponds to the elapsed time between the acquisition of a remote input and the positioning of a remote output.
This is a logic response time, which does not take filtering time and actuator and sensor interface response times into account.

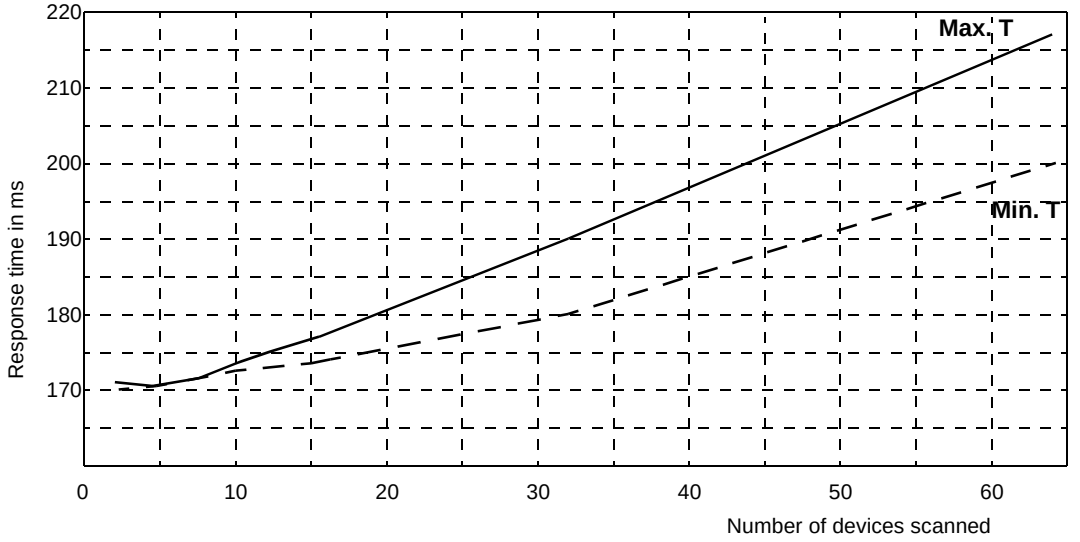
This is an example of time elapsed from acquiring an input to the positioning of an output:



Response time with a cycle of 20 ms



Response time with a cycle of 80 ms



Global Data Utility Performances

At a Glance

The values presented below are given to evaluate the Global Data utility performance.

Definition

Global Data return time:
This time corresponds to the time elapsed between the publication of a variable value by the local PLC application, the subscription by a remote PLC application, the publication of the same value by the remote PLC application and the subscription by the local PLC application.

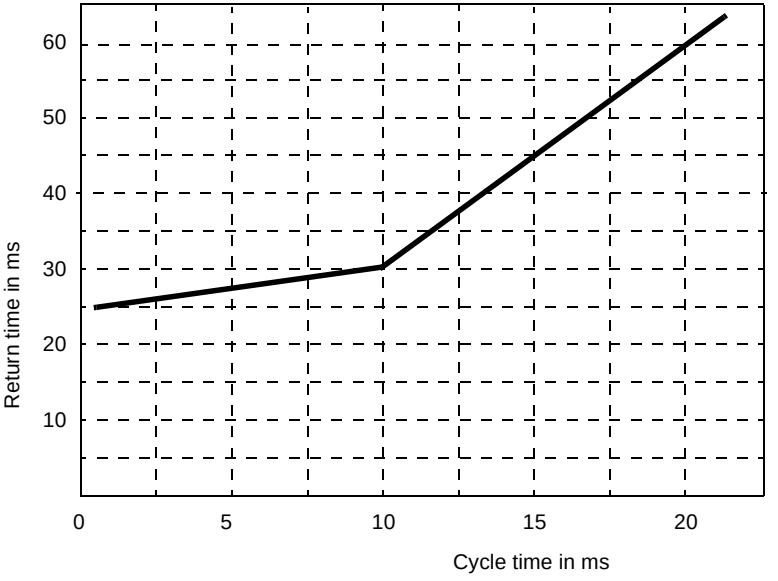
Values

Measurement conditions:

- The cycle time for local and remote PLC applications are identical.
- Only one variable is exchanged in each direction.

Result:

PLC cycle time	Return time
>= 10 ms	3 times the PLC cycle time
= 5 ms	5 to 6 times the PLC cycle time

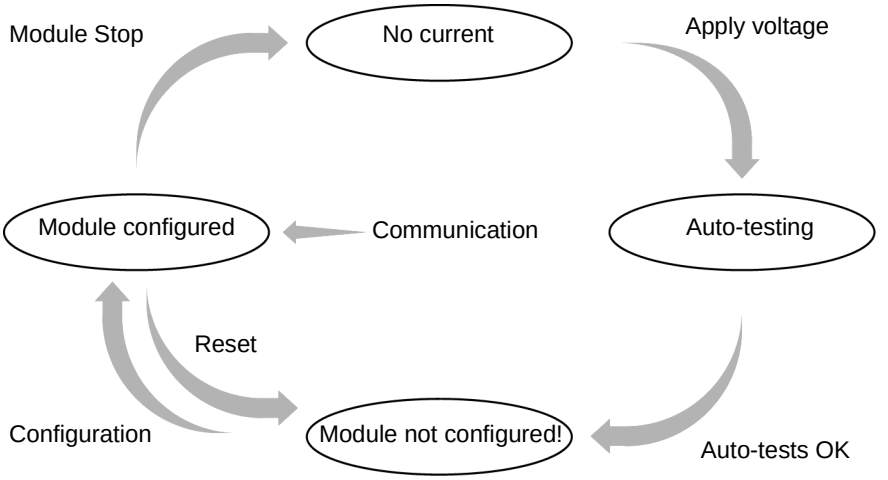


Operating Modes for the TSX ETY 4103, TSX ETY PORT and TSX ETY 5103 Modules

At a Glance

The following diagram describes the operating modes of the TSX ETY 4103/PORT/5103 module.

General Diagram



Operation

- After power-up, the module carries out self-testing. During this phase, the STS LED is lit. After the self tests, the RUN LED lights up.
- The module does not operate with a default configuration. It must be sent this configuration by the application of the local PLC.
  The configuration values are given in the list of language objects %KW and in particular provide the IP address and the X-Way address of the module.
  The configuration is retransmitted upon every PLC restart (warm or cold).
- When the configuration is received, the module resets the current communication to zero before configuring itself (terminates current exchanges, shuts down TCP connections).
  The module is now operational. The RUN and STS LEDs are lit up.
- The I/O Scanning and Global Data functions start when the PLC transfers to RUN mode. They stop when it switches to STOP mode.

Special Cases

If a TSX ETY 4103/PORT/5103 module is not configured in the Unity Pro application (RUN LED off and ERR LED blinking), it takes the IP address built from its MAC address:
085.016.xxx.yyy where xxx and yyy are the last two numbers of the MAC address.
Example
The module's MAC address is (in hexadecimal): 00 80 F4 01 12 20
In this case the default IP address is (in decimal): 085.016.018.032

The module also transmits BOOTP/DHCP requests to obtain another IP address. These requests are sent until a BOOTP/DHCP server responds or until configuration by Unity Pro.

If the module detects a duplicated IP address, the STS LED flashes 4 times during one minute (the same applies for the module that has the same IP address).

8.2 Configuration

Introduction

This section describes the implementation of a **TSX ETY 4103, TSX ETY PORT, TSX WMY 100** or **TSX ETY 5103** module during its configuration.

What's in this Section?

This section contains the following topics:

Topic	Page
Module Configuration Screen	211
Type of Communication According to Connection Configuration	213
Configuration of TCP/IP Messaging	217
I/O Scanning Utility Configuration	220
Address Server Configuration	223
Configuring the Global Data Utility	225
Configuration of the SNMP Utility	227
Configuring the Time Synchronization Service	229
Configuring the Electronic Mail Notification Service	234
Bandwidth Checking Utility	236
Configuration of the Bridge Function	238

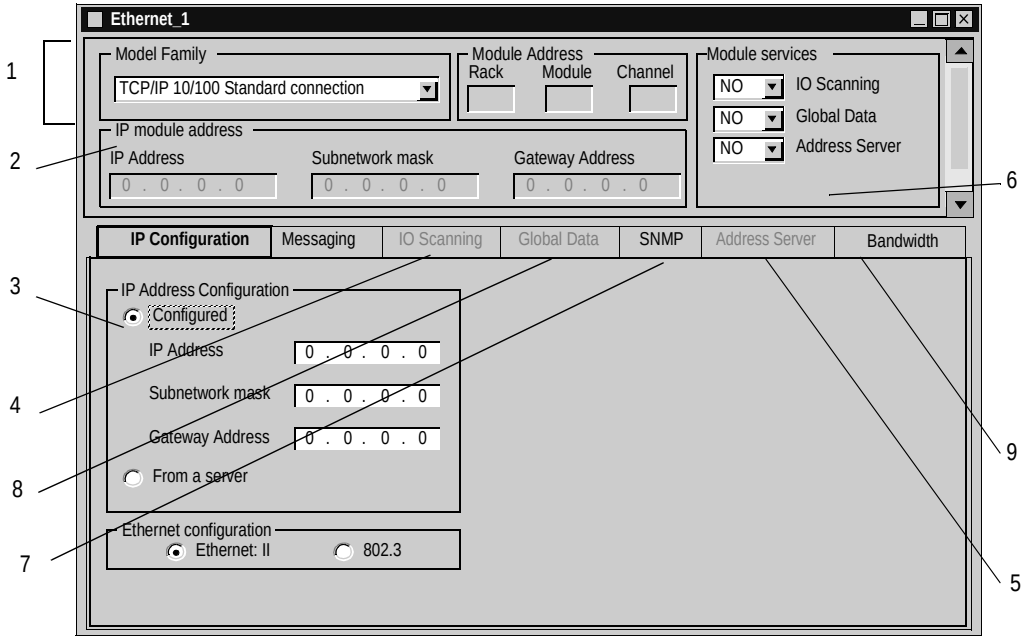
Module Configuration Screen

Introduction

This screen, separated into two zones, is used to declare the communication channel and to configure the necessary parameters for an Ethernet link.

Figure

The screen dedicated to Ethernet communication is displayed as follows:



Elements and Functions

This table describes the various zones that make up the configuration screen:

Zone	Number	Function
common	1	Common part of the Ethernet communication configuration screens. This part enables you to choose the network family to be configured. When the network is associated with a module, the module address appears in the **Module address** zone.
specific	2	allows the display of the module address.
	3	enables the configuration of TCP/IP services (see ***p. 122***).
	4	allows configuration of the I/O Scanning utility (see ***p. 130***).
	5	allows configuration of the address server (see ***p. 135***).
	6	allows selection of the utilities used by the module.
	7	allows configuration of the SNMP utility (see ***p. 138***).
	8	allows configuration of the Global Data utility (see ***p. 142***).
	9	allows you to check that the utilities configured are compatible with the processing capacity of the Ethernet channel.
		allows configuration of the Time Service utility (see ***p. 146***).
		allows configuration of the Mail Service utility (see ***p. 152***).

Note: if you have configured the I/O Scanning, Global Data or Address Server utilities for the TSX WMY 100 module, the project generation will fail as these utilities are not available for this module. Nor is the bandwidth configuration available for this module.

Type of Communication According to Connection Configuration

At a Glance

Depending on the connection configuration of the TSX ETY 4103/PORT/5103 module, you can carry out messaging (see ***p. 127***).

- in mono-connection
- in multi-connection.

According to the type of protocol and access control management, multi-connection mode requires a specific configuration of the correspondence table.

Note: In the following, only examples of multi-connection will be dealt with. Furthermore, the emphasis is placed on communication between the module and a remote PC device containing several applications.

Configuration Rules

Several connections can be configured with the same IP address. They must be defined with the same protocol, the same access rights, and the same connection mode.

In the case of a Modbus connection, only two connections can be configured with the same IP address. Addresses associated with these connections are:

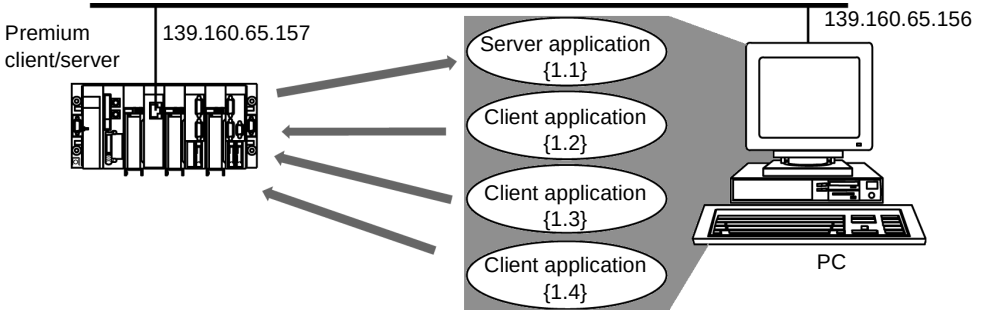
- an X-Way address (for example: {2.103}) for the Modbus client connection,
- an X-Way address equal to {x.x} for Modbus server connections.

Multi-Connection in UNI-TE Protocol with Access Management

In this example, the PC contains four applications with a unique X-Way address and one single IP address:

- The module opens a connection and communicates with the server application with the address {1.1}.
- Each of the other client applications with the address {1.2}, {1.3}, {1.4} is authorized to open a connection and communicate with the module.

Exchanges are carried out according to the UNI-TE protocol and the moduleís access control utility is enabled.



In order to implement this example, you must:

- activate connection management by checking the moduleís **Access control** box,
- configure communication from the module to the PCís server application in the table
  - **X-Way address**: 1.1
  - **IP address**: 139.160.65.156
  - **Protocol**: UNI-TE
  - **Access**: authorized (cell checked)
  - **Mode**: Multi
- configure communication of each of the PCís client applications to the server module in the table:
  - **X-Way address**: 1.2 and 1.3 and 1.4
  - **IP address**: 139.160.65.156
  - **Protocol**: UNI-TE
  - **Access**: authorized (cell checked)
  - **Mode**: Multi

Multi-Connection in UNI-TE Protocol Without Access Management

This example is the same as the previous one, except that access control is not configured.

In this case, if the application {1.1} is the only server application, the moduleís correspondence table only contains the following line:

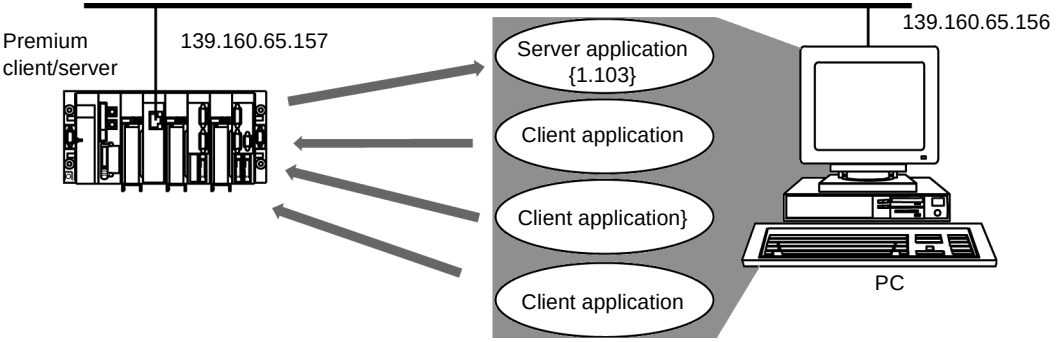
- **X-Way address**: 1.1
- **IP address**: 139.160.65.156
- **Protocol**: UNI-TE
- **Access**: the cell is grayed out
- **Mode**: Multi

Multi-Connection in Modbus Protocol with Access Management

In this example, the PC contains four applications. The server application has an imaginary X-Way address and the other client applications do not need an X-Way address:

- The module opens a connection and communicates with the server application with the imaginary address {1.103}.
- Each of the client applications has no address but is authorized to open a connection and communicates with the module.

Exchanges are carried out according to the Modbus protocol and the moduleís access control utility is enabled.



In order to implement this example, you must:

- activate connection management by checking the moduleís **Access control** box,
- configure communication from the module to the PCís server application in the table
  - **X-Way address**: 1.103 (address between 100 and 163)
  - **IP address**: 139.160.65.156
  - **Protocol**: Modbus
  - **Access**: the cell is grayed out
  - **Mode**: Multi
- configure communication of all the PCís client applications to the server module in the table:
  - **X-Way address**: x.x (this address allows you to specify that other applications exist for the same IP address)
  - **IP address**: 139.160.65.156
  - **Protocol**: Modbus
  - **Access**: authorized (allows you to specify that other applications are authorized to connect and communicate)
  - **Mode**: Multi

Note: If you want to prevent connection by client applications you must configure
- **X-Way address**: x.x (this address allows you to specify that other applications exist for the same IP address)
- **IP address**: 139.160.65.156
- **Protocol**: Modbus
- **Access**: not authorized (cell unchecked)
- **Mode**: Multi

Multi-connection in Modbus Protocol without Access Management

This example is the same as the previous one, except that access control is not configured.
In this case, if the application {1,103} is the only server application, the moduleís correspondence table only contains the following line:
- **X-Way address**: 1.103
- **IP address**: 139.160.65.156
- **Protocol**: Modbus
- **Access**: the cell is grayed out
- **Mode**: Multi

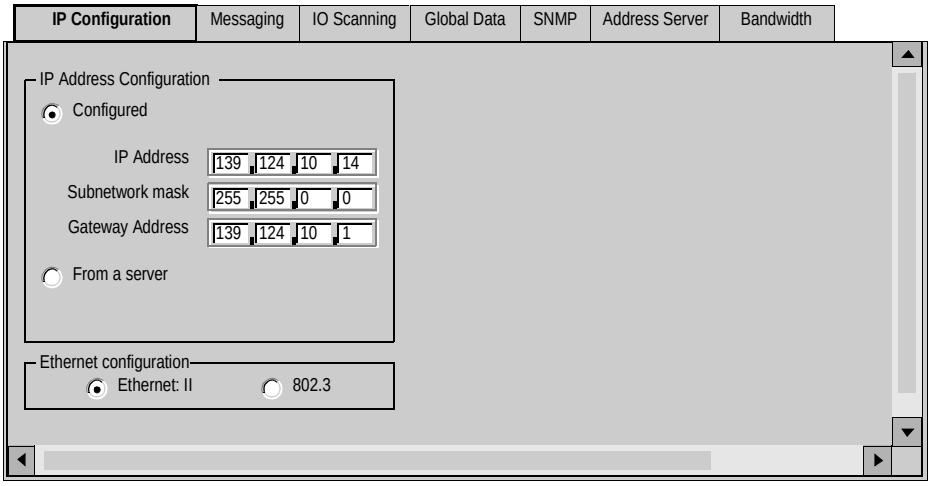
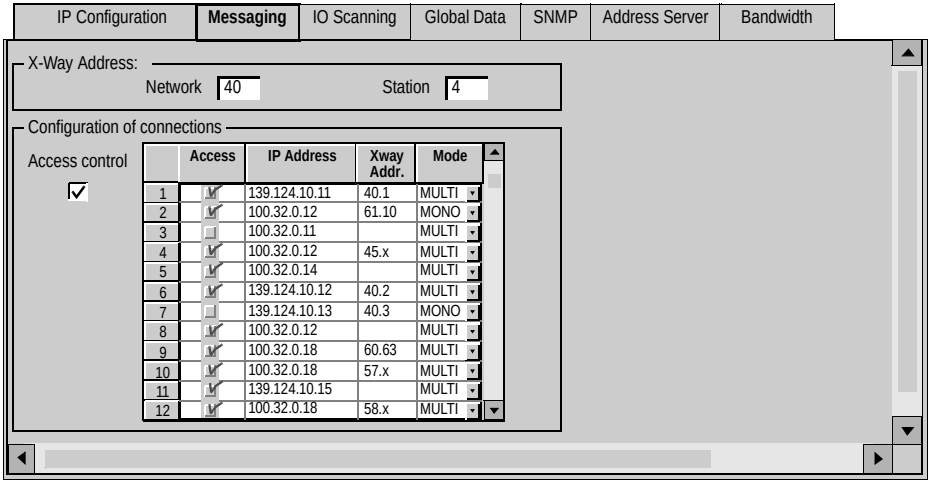
Configuration of TCP/IP Messaging

Introduction

In order to use the TSX ETY 4103/5103 module to communicate on Ethernet, it is necessary to set the ***Configuration Parameters Linked to TCP/IP Utilities*** ***(see p. 123***).
Messaging is configured in the two windows accessible by the tabs: I**P Configuration** and **Messaging**.

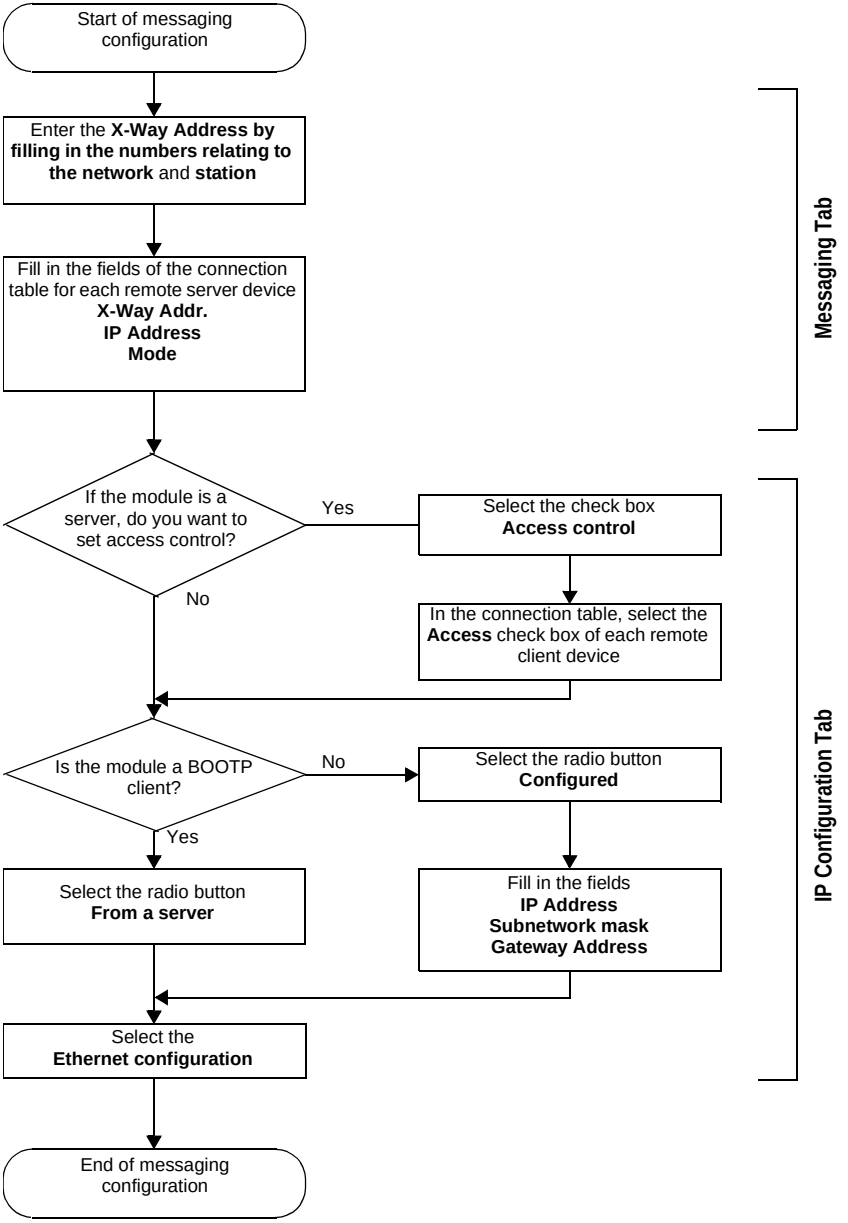
How to Access the Messaging

The procedure for accessing the configuration parameters for TCP/IP utilities is as follows.

Step	Action
1	Access the module configuration screen.
2	Select the **IP Configuration** tab. **Result** 
3	Select the **Messaging** tab. **Result** 

How to Configure the Messaging

The following procedure gives the configuration principle.


Start of messaging configuration
Enter the **X-Way Address by filling in the numbers relating to the network** and **station**
Fill in the fields of the connection table for each remote server device
X-Way Addr.
IP Address
Mode
Messaging Tab
If the module is a server, do you want to set access control?
Yes
Select the check box **Access control**
No
In the connection table, select the **Access** check box of each remote client device
Is the module a BOOTP client?
No
Select the radio button **Configured**
Yes
Select the radio button **From a server**
Fill in the fields
IP Address
Subnetwork mask
Gateway Address
Select the **Ethernet configuration**
IP Configuration Tab
End of messaging configuration

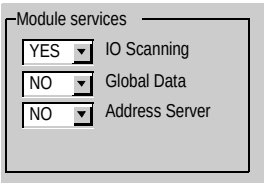
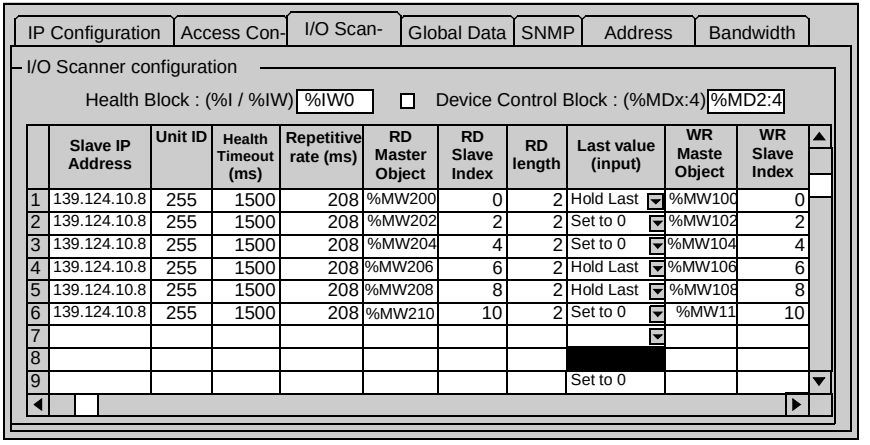
I/O Scanning Utility Configuration

Introduction

In order to use the TSX ETY 4103/5103 module to control remote I/Os, it is necessary to set the configuration parameters of the I/O Scanning utility (see ***p. 130***).

How to Access I/O Scanning

The procedure for accessing the configuration parameters for the I/O Scanning utility is as follows.

Step	Action
1	Access the module configuration screen.
2	In the **Module utilities** zone select the option **YES** in the **I/O Scanning** menu.  The **I/O Scanning** tab is no longer grayed out.
3	Select the **I/O Scanning** tab. **Result** 

	Slave IP Address	Unit ID	Health Timeout (ms)	Repetitive rate (ms)	RD Master Object	RD Slave Index	RD length	Last value (input)	WR Maste Object	WR Slave Index
1	139.124.10.8	255	1500	208	%MW200	0	2	Hold Last	%MW100	0
2	139.124.10.8	255	1500	208	%MW202	2	2	Set to 0	%MW102	2
3	139.124.10.8	255	1500	208	%MW204	4	2	Set to 0	%MW104	4
4	139.124.10.8	255	1500	208	%MW206	6	2	Hold Last	%MW106	6
5	139.124.10.8	255	1500	208	%MW208	8	2	Hold Last	%MW108	8
6	139.124.10.8	255	1500	208	%MW210	10	2	Set to 0	%MW11	10
7										
8										
9								Set to 0		

How to Configure I/O Scanning

The following procedure gives the configuration principles for the I/O Scanning utility.

Step	Action
1	Set the address of the beginning of the internal words (in the application memory) which are dedicated to I/O scanning: ● **Read** zone ● **Write** zone
2	For each device, enter the **IP Address**.
3	Enter for each device, if necessary, the **Unit ID** Modbus slave address.
4	Enter, if required, a health Time-out value in ms.
5	Enter the **repetition periods** of the remote device (scanning period of the slave).
6	For each device, enter the address of the variables read in each slave **Slave index (read)**.
7	For each device, enter the number of words to be sent in read format in **Length (read)**.
8	Select the input fallback mode in **Fallback value (read)**.
9	For each device, enter the address of the variables written in each slave **Slave index (write)**.
10	For each device, enter the number of words to be sent in write format in **Length (write)**.
11	For each device enter, if necessary, a comment in **Description**.

How to Configure a Specific Read and Write Scenario

When scanned, certain devices, such as TSX ETY modules, do not support simultaneous read/write requests. In this case, to read/write inputs/outputs, the following procedure must be performed.

Step	Action
1	Enter the **IP Address** of the device
2	If necessary, enter the deviceís **Unit ID** Modbus slave address.
3	Select the scanning period of the slave.
4	Enter the address of the read variables of the slave **Slave index (read)**.
5	Enter the number of words to be sent in read format in **Length (read)**.
6	Enter **0** in **Slave index (write)**.
7	Enter **0** in **Length (write)**.
8	On the following line, enter the same **IP Address**
9	Enter, if necessary, the same **Unit ID** Modbus slave address.
10	Select the same period.
11	Enter **0** in **Slave index (read)**.
12	Enter **0** in **Length (read)**.
13	Enter the write destination address in **Slave index (write)**.
14	Enter the number of words to be sent in read format in **Length (write)**.

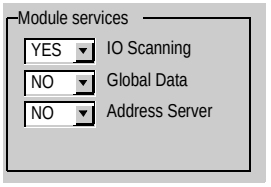
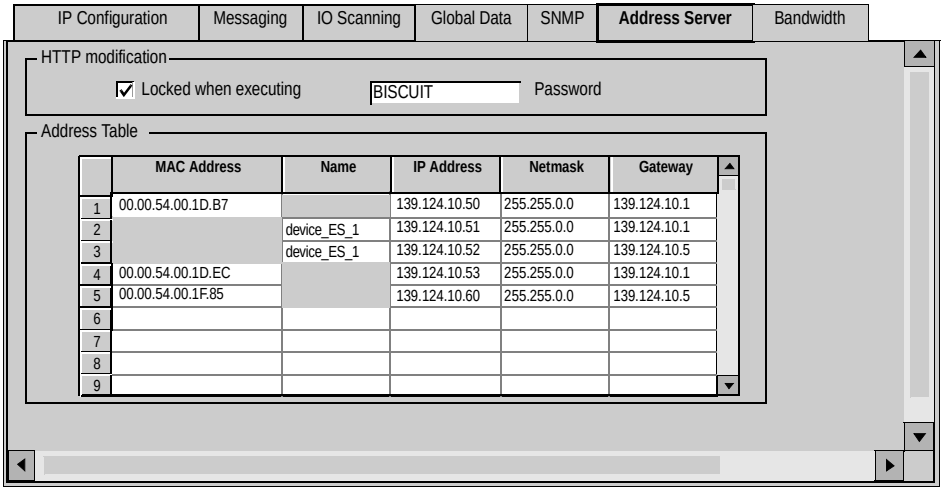
Address Server Configuration

Introduction

In order to use the TSX ETY 4103/PORT/5103 module as an address server, it is necessary to set the configuration parameters of the address server (see ***p. 135***).

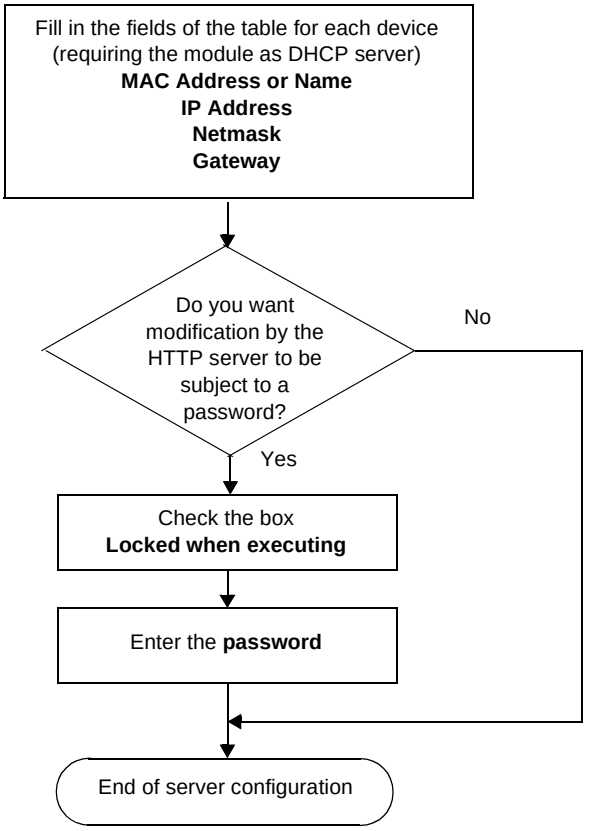
How to Access the Address Server

The procedure for accessing the configuration parameters of the address server utility is as follows.

Step	Action
1	Access the module configuration screen.
2	In the **Module utilities** zone, select the **Address Server** check-box.  The **Address Server** tab is no longer grayed out.
3	Select the **Address Server** tab. **Result** 
4	Fill in all the fields with information on the devices **Note** : the MAC address is coded on 6 bytes and is of the form: 00 00 54 F6 E3 2F.

How to Configure the Server

The following procedure gives the server configuration principle.


Fill in the fields of the table for each device
(requiring the module as DHCP server)
MAC Address or Name
IP Address
Netmask
Gateway
Do you want modification by the HTTP server to be subject to a password?
No
Yes
Check the box
Locked when executing
Enter the password
End of server configuration

Configuring the Global Data Utility

Introduction

In order to use the TXS ETY 4103/PORT/5103 module to use the Global Data utility, it is necessary to set the configuration parameters (see ***p. 143***).

How to Access the Global Data Utility

To access the Global Data utility, proceed in the following way:

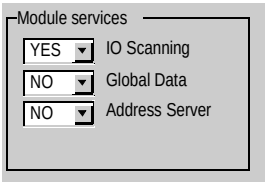
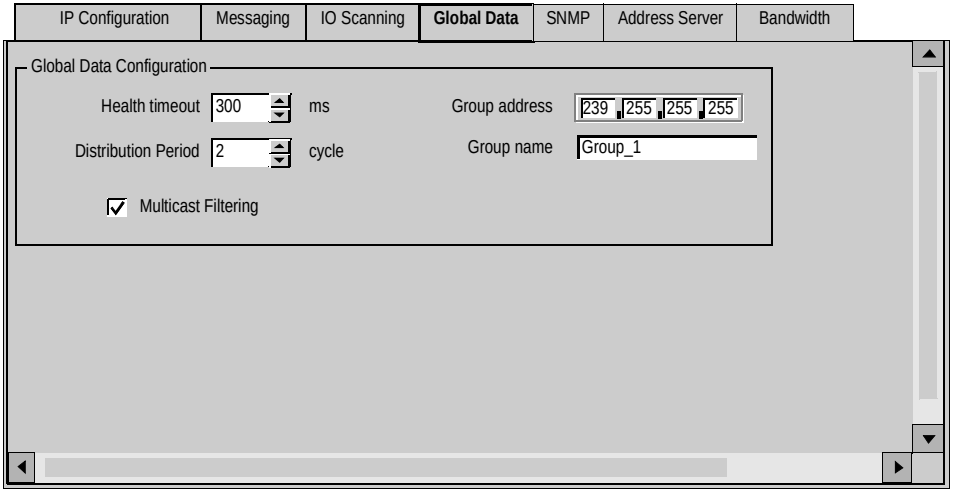
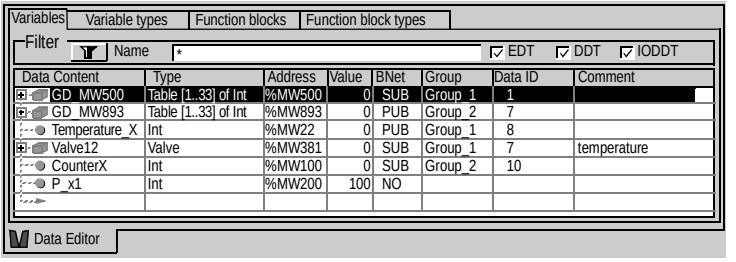
Step	Action
1	Access the module configuration screen
2	In the Module utilities zone, select the **Global Data** check box  The **Global Data** tab is no longer grayed out
3	Select the **Global Data** tab **Result** 

Table of Variables

In order to configure the Global Data variables, you must previously go to the Unity Pro **variable editor**:

Step	Action
1	Go to the Unity Pro variable editor. View of the editor: 
2	For each Global Data variable, define whether it is published (**PUB**) or subscribed (**SUB**) in the **ENet** field.
3	Give the Global Data group a name in the **Group** field.
4	Fill in the **DataID** field: identifier of a remote station in a distribution group.

Configuring Global Data

To configure the Global Data utility, take the following steps in the **Global data configuration** zone:

Step	Action
1	Indicate the Distribution **Group Address** to which the station belongs, between 224.0.0.0 and 239.255.255.255.
2	Adjust the **Distribution Period** to between 1 and 50 PLC cycles.
3	Fill in the **group name** defined in the Unity Pro data editor (see above).
4	Define the **Health time out**. This value can be adjusted from 50 to 1000 ms (in increments of 50ms).

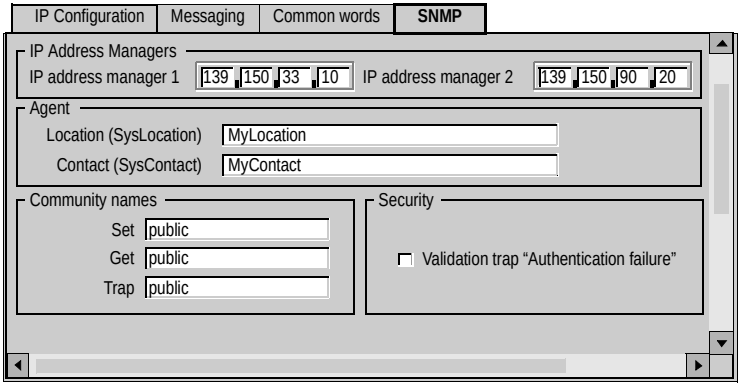
Configuration of the SNMP Utility

Introduction

In order to use the TSX ETY 4103/PORT/5103 module as an SNMP agent, it is necessary to adjust the configuration parameters of the SNMP utility (see ***p. 138***).

How to Access the SNMP Utility

The procedure for accessing the configuration parameters for the SNMP utility is as follows.

Step	Action
1	Access the module configuration screen.
2	Select the **SNMP** tab. **Result** 

How to Configure SNMP

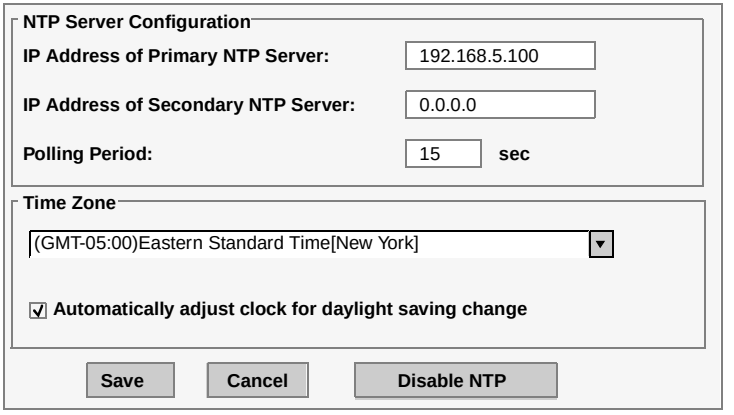
The following procedure gives the configuration principle for the SNMP utility.

Step	Action
1	Enter the SNMP manager addresses: ● **Manager 1 IP addresses** ● **Manager 2 IP addresses**
2	Fill in the fields: ● **Location (SysLocation)** ● **Contact (SysLocation)**. Or alternatively check the **SNMP Manager** box to indicate that the information will be completed by the SNMP Manager.
3	If you want to set access rights, fill in the commUnity Pro names: ● **Set** ● **Get** ● **Trap**
4	If you want to activate transmission of an event to the module, check the **Activate "Authentication Failure" trap** box.

Configuring the Time Synchronization Service

Configuring the Time Service with the NTP Configuration Page

You must use the moduleís embedded Web page to configure the time service. No other method is available.



Time Service Command Buttons

Execute the following commands

Command Button	Description
Save	Stores new NTP (time service) configuration. Previous configuration is no longer valid.
Cancel	Cancels new NTP (time service) configuration. Previous configuration is valid
Disable NTP	IP of Primary and Standby set = 0. NTP server not polled Time in controller not updated.

Configurable Time Service Parameters

Configure or change the following parameters on the NTP Configuration page.

1. IP address of primary NTP server
   - Enter a valid IP address
2. IP address of secondary NTP server
   - Enter a valid IP address
3. Polling Period (in seconds)
   Enter a value
   - min = 1sec
   - max = 120sec
   - default = 5 sec
4. Time Zone
   - Select from drop-down menu
     Universal Time, Coordinated (GMT) = default
   - Custom time zone
5. Automatically adjust clock for daylight saving change
   - Parameter is selected by default (check mark appears) if daylight saving time is chosen.

Changing Time Service Parameters

To make any changes to the time synchronization service,

Step	Action
1	Enter changes in the appropriate field on the NTP Configuration page for one or all of the configurable parameters.
2	Click Save.

Important Information about the Time Service

Note: About the Time Service

1. Enable/Disable Daylight Savings Time parameter
   If the Enable/Disable check box is selected, the module automatically corrects the local time to account for daylight savings time. Therefore, requiring no action, as the daylight savings time start and end are automatically changed each year.
2. Polling Time Parameter
   The time (in seconds) is the time between time updates from the NTP server. The default is 5 Seconds.
3. Storing the Time Service Configuration
   The last time service configuration is saved internally in the Ethernet module.
4. Replacing the Ethernet Module
   If the Ethernet module has to be replaced, the stored configuration is lost, and the system returns to the default configuration.

Customizing Time Zone Parameters

If you want a time zone not listed in the time zone table,

Step	Action	Comment
1	Write the text rules for the custom time zone.	
2	Using an FTP client, store your rules in the file: /FLASH0/wwwroot/conf/NTP/customrules user ID: ntpupdate password: ntpupdate	Root directory to store 'customrules' is set by the FTP server as /FLASH0/wwwroot/conf/NTP
3	When the rules are written, choose the drop down menu on the NTP Configuration web page, and configure (or reboot) the module by selecting Time Zone = Custom	The NTP component looks for customrules, calls the tz compiler and generates a new file called 'tz_custom'. This file is binary file and should not be edited. If the tz compiler detects a syntax error in customrules, the error is logged in the file: /FLASH0/wwwroot/conf/NTP/error.log **1.** NTP component is not launched **2.** NTP Status field in diagnostic web page displays NOT OK.
4	If you want more information, the syntax to write those rules along with a few examples are found in the module in /FLASH0/wwwroot/conf/NTP/instructions.txt	

Time Zone Parameters

Select one from drop-down menu.

Time Zone	Description	DST Available
Custom		Yes
(GMT-12:00)	Dateline Standard Time [Eniwetok Kwajalein]	No
(GMT-11:00)	Samoa Standard Time [Midway Is Samoa]	No
(GMT-10:00)	Hawaiian Standard Time [Hawaii Honolulu]	No
(GMT-09:00)	Alaskan Standard Time [Anchorage]	Yes
(GMT-08:00)	Pacific Standard Time [Los Angeles Tijuana]	Yes
(GMT-07:00)	Mexican Standard Time [Chihuahua La Paz Mazatlan]	Yes
(GMT-07:00)	Mountain Standard Time [Arizona Phoenix]	No
(GMT-07:00)	Mountain Standard Time [Denver]	Yes
(GMT-06:00)	Central Standard Time [Chicago]	Yes
(GMT-06:00)	Mexico Standard Time [Tegucigalpa]	No

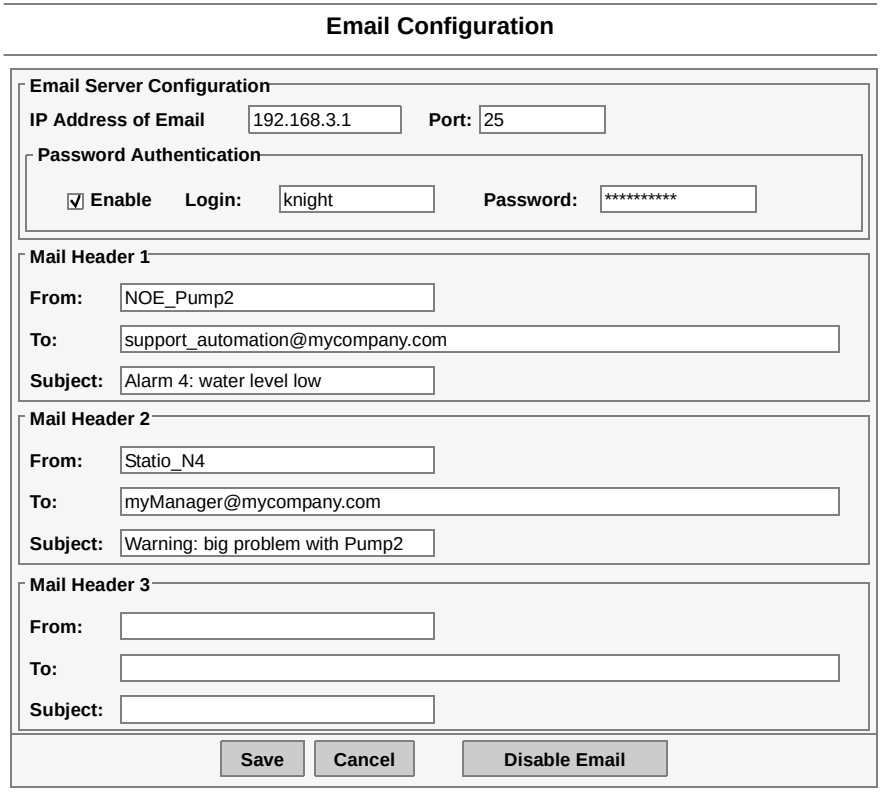
Time Zone	Description	DST Available
(GMT-06:00)	Canada Central Standard Time [Saskatchewan Regina]	No
(GMT-06:00)	Central America Standard Time [Mexico_city]	Yes
(GMT-05:00)	SA Pacific Standard Time [Bogota Lima Quito]	No
(GMT-05:00)	Eastern Standard Time [New York]	Yes
(GMT-05:00)	Eastern Standard Time [Indiana (East)] [Indianapolis]	No
(GMT-04:00)	SA Western Standard Time [Caracas La Paz]	No
(GMT-04:00)	Pacific SA Standard Time [Santiago]	Yes
(GMT-03:30)	Newfoundland Standard Time [Newfoundland St Johns]	Yes
(GMT-03:00)	E. South America Standard Time [Brasilia Sao_Paulo]	Yes
(GMT-03:00)	SA Eastern Standard Time [Buenos Aires Georgetown]	No
(GMT-02:00)	Mid-Atlantic Standard Time [South_Georgia]	No
(GMT-01:00)	Azores Standard Time [Azores Cape Verde Island]	Yes
(GMT)	Universal Coordinated Time [Casablanca, Monrovia]	No
(GMT0)	Greenwich Mean Time [Dublin Edinburgh Lisbon London]	Yes
(GMT+01:00)	Romance Standard Time [Amsterdam CopenHagen Madrid Paris Vilnius]	Yes
(GMT+01:00)	Central European Standard Time [Belgrade Sarajevo Skopje Sofija Zagreb]	Yes
(GMT+01:00)	Central Europe Standard Time [Bratislava Budapest Ljubljana Prague Warsaw]	Yes
(GMT+01:00)	W. Europe Standard Time [Brussels Berlin Bern Rome Stockholm Vienna]	Yes
(GMT+02:00)	GTB Standard Time [Athens Istanbul Minsk]	Yes
(GMT+02:00)	E. Europe Standard Time [Bucharest]	Yes
(GMT+02:00)	Egypt Standard Time [Cairo]	Yes
(GMT+02:00)	South Africa Standard Time [Johannesburg Harare Pretoria]	No
(GMT+02:00)	FLE Standard Time [Helsinki Riga Tallinn]	Yes
(GMT+02:00)	Israel Standard Time [Israel Jerusalem]	Yes
(GMT+03:00)	Arabic Standard Time [Baghdad]	Yes
(GMT+03:00)	Arab Standard Time [Kuwait Riyadh]	No
(GMT+03:00)	Russian Standard Time [Moscow St. Petersburg Volgograd]	Yes
(GMT+03:00)	E. Africa Standard Time [Nairobi]	No
(GMT+03:30)	Iran Standard Time [Tehran]	Yes
(GMT+04:00)	Arabian Standard Time [Abu Dhabi Muscat]	No

Time Zone	Description	DST Available
(GMT+04:00)	Caucasus Standard Time [Baku Tbilisi]	Yes
(GMT+04:00)	Afghanistan Standard Time [Kabul]	No
(GMT+05:00)	Ekaterinburg Standard Time [Ekaterinburg]	Yes
(GMT+05:00)	West Asia Standard Time [Islamabad Karachi Tashkent]	No
(GMT+05:30)	India Standard Time [Bombay Calcutta Madras New Delhi]	No
(GMT+06:00)	Central Asia Standard Time [Almaty Dhaka]	Yes
(GMT+06:00)	Sri Lanka Standard Time [Columbo]	No
(GMT+07:00)	SE Asia Standard Time [Bangkok Hanoi Jakarta]	No
(GMT+08:00)	China Standard Time [Beijing Chongqing Hong Kong Urumqi]	No
(GMT+08:00)	W. Australia Standard Time [Perth]	No
(GMT+08:00)	Singapore Standard Time [Singapore]	No
(GMT+08:00)	Taipei Standard Time [Taipei]	No
(GMT+09:00)	Tokyo Standard Time [Osako Sapporo Tokyo]	No
(GMT+09:00)	Korea Standard Time [Seoul]	No
(GMT+09:00)	Yakutsk Standard Time [Yakutsk]	Yes
(GMT+09:30)	Cen. Australia Standard Time [Adelaide]	Yes
(GMT+09:30)	AUS Central Standard Time [Darwin]	No
(GMT+10:00)	E. Australia Standard Time [Brisbane]	No
(GMT+10:00)	AUS Eastern Standard Time [Canberra Melbourne Sydney]	Yes
(GMT+10:00)	West Pacific Standard Time [Guam Port Moresby]	No
(GMT+10:00)	Tasmania Standard Time [Hobart]	Yes
(GMT+10:00)	Vladivostok Standard Time [Vladivostok]	Yes
(GMT+11:00)	Central Pacific Standard Time [Magadan Solomon Is New Caledonia]	Yes
(GMT+12:00)	New Zealand Standard Time [Auckland Wellington]	Yes
(GMT+12:00)	Fiji Standard Time [Fiji Kamchatka Marshall Is]	No

Configuring the Electronic Mail Notification Service

Configuring the Mail Service with the Email Configuration Page

You must use the moduleís embedded Web page to configure the electronic mail notification service. No other method is available.



Mail Service Command Buttons

Mail service configuration buttons

Command Button	Description
Save	Saves the new Email configuration. Note: Previous configuration is not valid. Previous configuration is not stored.
Cancel	Cancels the entries in the fields. Previous configuration is valid.
Disable Email	Clears the stored configuration, and disables the email service. Note: Next time the service is enabled, a new configuration is required.

Configurable Mail Service Parameters

Configure the following parameters.

Parameter	Description
IP address of Email	Enter a valid IP address This parameter identifies SMTP server.
Port	Default = 25 If needed, enter a new value.

Password Authentication	If security is needed, enable Password Authentication.
	To enable, enter a check mark in the box.
	Enter values for
	● Login
	  ● Any printable character allowed
	  ● 12 character maximum
	● Password
	  ● Any printable character allowed
	  ● 12 character maximum

3 mail headers	Each header must contain
	1. senderís ID in the "From:" field
	  ● 32 character maximum; no spaces
	2. list of recipients in the "To:" field
	  ● Separate each email address with a comma.
	  ● 128 character maximum
	3. fixed part of message in the "Subject:" field[1].
	  ● (32 character maximum)

1. Subject field consists of two parts:
1. Fixed
  ● 32 character maximum
2. Dynamic
  ● 206 character maximum	

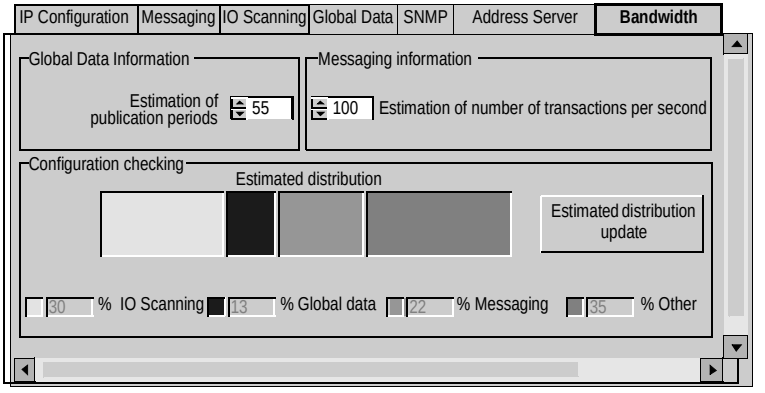
Bandwidth Checking Utility

Introduction

The TSX ETY 4103/PORT/5103 module offers a utility for checking the bandwidth used.

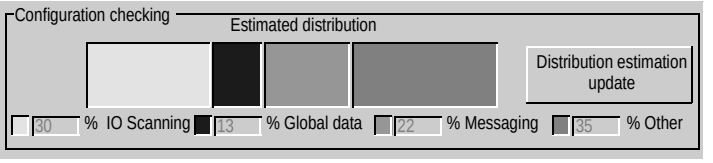
How to Access the Utility

The procedure for accessing the configuration parameters of the bandwidth checking utility is as follows.

Step	Action
1	Access the module configuration screen.
2	Select the **Bandwidth** tab. **Result** 

Using the Bandwidth Utility

To use the Bandwidth utility, proceed in the following way:

Step	Action
1	Once you have configured the I/O scanning and Global Data utilities, enter, in the **Messaging data** zone, the **estimated number of transactions per second**.
2	In the **Global Data information** zone, indicate the **estimated publication periods**. The value entered must be the estimated average publication frequency of the distribution group stations (local and remote stations). **Example** : your application publishes the variable 5 and subscribes variables 12 and 15, published by a PLC 1 and a PLC 2. Your publication is configured at 150 ms. PLC 1 publishes variable 12 every 100 ms. PLC 2 publishes variable 15 every 200 ms. The value to be entered is 150 ms: arithmetic mean (150+100+200)/3.
3	To view the bandwidth distribution estimation, click the button **Update distribution estimation**. 
4	If the module load overflows, the message: "Module load cannot exceed 100%" appears. Repeat steps 1 to 3 to adjust the configuration parameters until the module load is correct.

Configuration of the Bridge Function

Introduction

The TSX ETY 4103/PORT/5103 module can be used as an X-Way bridge station. This guarantees transparent communication between various networks.

Note: the installation of this function is described in the manual Communication architecture and services.

8.3 Debug

At a Glance

This section describes the implementation of a **TSX ETY 4103, TSX ETY PORT, TSX WMY 100** or **TSX ETY 5103** module during its configuration.

What's in this Section?

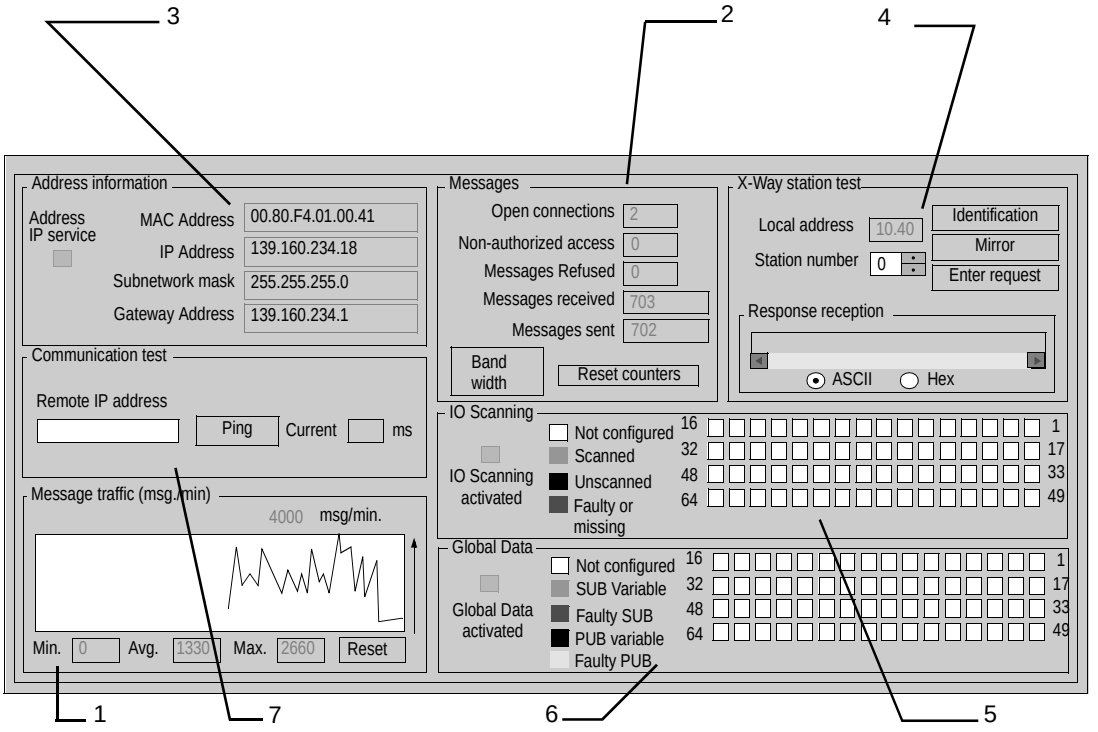
This section contains the following topics:

Topic	Page
Module Debugging Screen	240
General Debugging Parameters	242
Debugging Parameters for TCP/IP Utilities	243
How to Test TCP/IP Communication with the Ping Request	244
Requests Available for the Communication Channel Test	245
How to Test a Channel with the Identification and Mirror Requests	246
How to Test a Channel with Requests	247
Debugging Parameters for the I/O Scanning Utility	248
Debugging Parameters for the Global Data Utility	249
Bandwidth Control Diagnostic Parameters	250

Module Debugging Screen

Introduction This screen, separated into eight zones, allows debugging via an Ethernet link.

Figure The screen dedicated to Ethernet communication is displayed as follows:



Elements and Functions

This table describes the different zones that make up the debugging screen:

Number	Zone	Function
1	Message traffic	allows the graphical display of the number of messages processed by the module:
2	Messages	allows you to view the number of connections and unacknowledged or rejected messages. The counter values can be reset using the button **Reset Counters** A **Bandwidth** button is used to access bandwidth diagnostics.
3	Address information	allows: ● display of TCP/IP utilities configuration, ● communication testing of the TCP/IP profile.
4	X-Way station test	allows UNI-TE communication testing on the TCP/IP profile.
5	I/O Scanning	allows display of the status for each remote input/output module.
6	Global Data	allows display of the status for Global Data variables.
7	Communication test	is used to perform a communication test

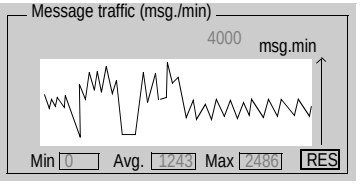
General Debugging Parameters

Introduction

The general debugging parameters are grouped together in two windows:
- the **Message traffic** window,
- the **Messages** window.

Message Traffic

The window is displayed as below:

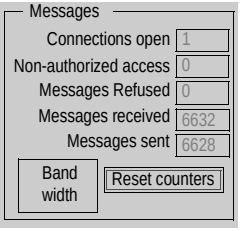


It indicates graphically the number of messages per minute processed by the module (send and receive). For better display, the scale automatically adapts to the flow rate.

The **Reset** button resets the three counters **Min.**, **Av.** and **Max.** to zero.

Messages

The window is displayed as below:



This window relates to TCP/IP messaging, and displays:
- the number of connections opened,
- the number of unauthorized accesses,
- the number of messages refused, received and sent.

To reset the counters to zero, simply click on the **Reset counter** button. To view the bandwidth status click on the **Bandwidth** button.

Debugging Parameters for TCP/IP Utilities

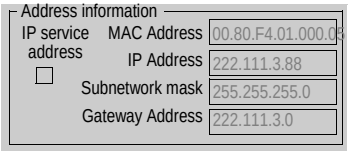
Introduction

The debugging parameters for the TCP/IP utilities are grouped together in two windows:

- the **Address information** window,
- the **Communication test** window.

Address Information

The window is displayed as below:

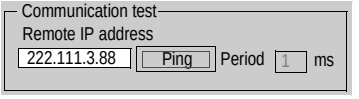


It specifies the configuration data of the IP address:

- **MAC address**: unique fixed address for a module
- **IP Address**
- **Subnetwork mask**
- **Gateway Address**: address of the gateway

Communication Test

Once the **Ping** button has been pressed, the window is displayed as follows:



This window is used to test IP communication towards another station.

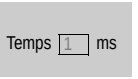
How to Test TCP/IP Communication with the Ping Request

At a Glance

This page indicates the procedure for testing TCP/IP communication from a **Ping** request.

Procedure

The following procedure is used to send the Ping request and therefore to test the correct routing of information between two devices.

Step	Action
1	From the main screen, click on the **Ping** button.
2	Enter the address of the station to be queried using the **Remote IP address** field.
3	Press the **Ping** button. **Result** The response appears in the **Time** field:  The returned time corresponds to the time it takes the message to be sent and return in ms.

Response Type

The following table groups together the various types of possible responses to the Ping request.

If the response is	then
positive	The windows records the time it takes the message to be sent and return in ms. a window appears with the message **Exchange successful**.
negative	a window with the message **Exchange incorrect** specifies that the remote device was not reached in the network architecture.

Requests Available for the Communication Channel Test

Introduction

This page describes the different possibilities for testing a communication channel from the debugging screen.

Test Conditions

Sending a request to an unconnected station results in an error message.
The test applies to stations belonging to the same local area network.

Available Requests

The **X-Way station test** window allows the following requests:

- **Identification** : prompts the Identification request to be sent to the designated remote station,
- **Mirror**: allows a mirror request to be sent to the designated station. Selecting this function gives access to a screen that allows you to select the length of the character string to be sent (a maximum of 80 characters). The PLC then sends this character string (ABCD.) to the destination device. This device automatically returns the string of characters received to the sender,
- **Request input**: allows a UNI-TE request, other than those provided by the command buttons, to be sent to the designated station. If this function is chosen, a screen appears allowing you to select the parameters specific to the request (the request code must be coded in hexadecimal).

Note: The first two requests are sent to the UNITE server of the TSX ETY module. The third is sent to the server of the processor.

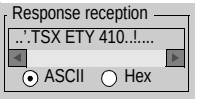
How to Test a Channel with the Identification and Mirror Requests

Introduction

This page indicates the procedure for testing a communication channel using the Identification and Mirror requests.

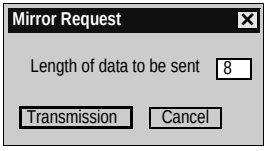
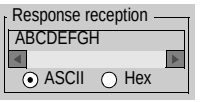
How to Identify a Station

The following procedure is used to identify a designated station.

Step	Actions
1	Select the address of the station to be queried using the **Station number** field.
2	Press the **Identification** button. **Result** The response appears in the **Receive Response** field: 

How to Send the Mirror Request

The following procedure is used to send the Mirror request and therefore to test the correct routing of information between two devices.

Step	Action
1	Select the address of the station to be queried using the **Station** field.
2	Press the **Mirror** button. **Result** The following window appears: 
3	Enter the length of the data to be sent (maximum 80 characters).
4	Press the **Send** button. **Result** The response appears in the **Receive Response** field:  The response contains: ● the character string ABCDEFGH corresponding to a length of data sent of 8.

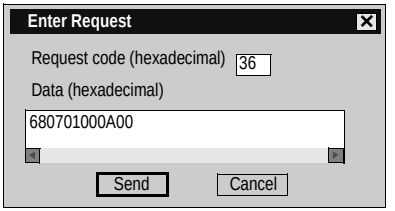
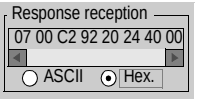
How to Test a Channel with Requests

Introduction

This page indicates the procedure to follow to test a communication channel from the debugging screen through different requests.

How to Send a Request

The following procedure allows a request, other than those provided by the command buttons, to be sent to a designated station. In this example, the request sent is used to read 10 words (from %MW1 to %MW10).

Step	Action
1	Select the address of the station to be interrogated with the help of the field **Station**.
2	Click on the button **Input Request**. **Result**: The following window appears :  The data sent in this example is coded on 6 bytes.
3	Input the function code (coded in hexadecimal on one byte), corresponding to the request that you want to send. For this example the read request code is 16#36.
4	Input the data to be sent by coding all the data in hexadecimal. The data is sent non-stop without any time intervals between them. When the data is coded on one word, the most significant and least significant bytes are reversed. For this example the data is as follows : ● 16#68 : on one byte, defines the segment (internal data), ● 16#07 : on one byte, defines the object type (words), ● 16#0100 : on one byte, defines the first word to read, ● 16#0A00 : on one byte, defines the number of words to read.
5	Click on the **Send** button. **Result**: The response appears in the **Receive Response** window :  The response from the example has data on 21 bytes. ● 16#07 : corresponds to object type (words), ● 16#00C2 : corresponds to the value of the first word (the most significant and least significant bytes are reversed, its value is 16#C200), ● ...

Debugging Parameters for the I/O Scanning Utility

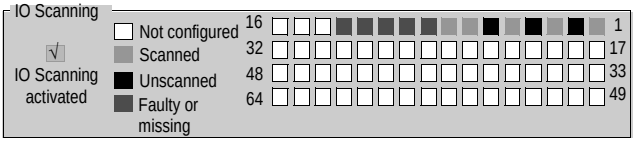
At a Glance

Note: No I/O Scanning for TSX WMY 100

When the I/O Scanning utility is activated, the status of each configured device is displayed on the screen.

I/O Scanning

The window is displayed as below:



A device referenced in the I/O Scanning configuration tab can have the following states:

- **Scanned**: green,
- **Not configured**: white,
- **Unscanned**: black (caused by I/O Scanning utility not being activated, none selected in configuration),
- **Faulty or absent**: red,

Note: In the cases of **Not configured** and **Unscanned**, no Modbus request is generated towards the device.

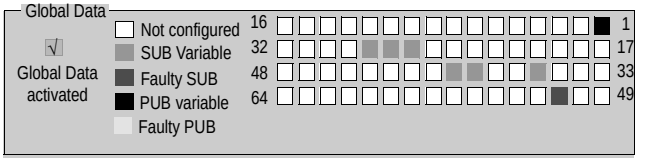
Debugging Parameters for the Global Data Utility

Introduction

When the Global Data utility is activated, the status of a Global Data variable is displayed on the screen.

Global Data

The window is displayed as below:



A Global Data variable can have the following status:

- **Not configured**: white,
- **SUB variable**: subscribed variable received in the health timeout limit, green,
- **Faulty SUB**: subscribed variable not received in the health time out limit, red,
- **PUB variable**: published variable, green,
- **Faulty PUB**: published variable not updated within the allotted period, yellow,

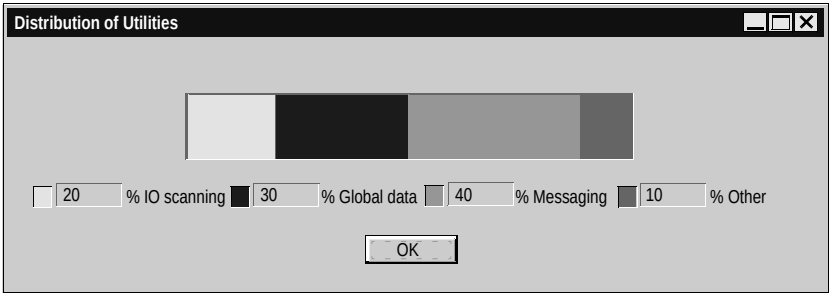
Bandwidth Control Diagnostic Parameters

Introduction

When bandwidth control is activated, the load of module TSX ETY 4103/PORT/5103 is displayed on the screen.

Bandwidth

The window is displayed as below:



This graphic displays the actual load distribution, between I/O Scanning , Global Data, Messaging and other utilities:

- **%IO Scanning**: yellow,
- **% Global Data**: blue,
- **% Messaging**: green,
- **% Other**: gray.

Return to configuration (see ***p. 236***) if you wish to modify this distribution.

Ethernet Coprocessor

9

At a Glance

This section concerns the software installation of the Ethernet channel built into the TSX P57 5634 processors.

What's in this Chapter?

This chapter contains the following sections:

Section	Topic	Page
9.1	General	252
9.2	Configuration	262
9.3	Debugging	274

9.1 General

At a Glance

This section describes the built-in Ethernet communication of coprocessors.

What's in this Section?

This section contains the following topics:

Topic	Page
General	253
Characteristics	254
Type of Connections Supported	255
Performance of I/O Scanning Utility	257
Global Data Utility Performances	259
Operating Modes of the Ethernet Channel of the TSX P57 5634	260

General

At a Glance

The Ethernet communication channel built into the processors concerns the following references:

- TSX P 57 264,
- TSX P 57 284,
- TSX P 57 364,
- TSX P 57 484,
- TSX P57 5634,

The characteristics of the Ethernet channel of the first four processors (called TSX ETY PORT in the previous sections) are the same as those of the Ethernet channel of the module **TSX ETY 4103** (see ***p. 199***).

In section, we will describe the special features of the Ethernet channel of the **TSX P57 5634** processor.

This channel offers connection to a TCP/IP network supporting the UNI-TE and Modbus messaging utilities on a TCP/IP profile.
It also offers the following utilities:

- Thanks to its SNMP agent functionality, it can be supervised by one or two SNMP managers.
- It can perform the role of an address server.
- Because of its I/O Scanning facility, the module can control remote inputs/outputs on the Ethernet network.
- It has an embedded HTTP server.
- Thanks to the Global Data utility, it allows data to be exchanged between IEC standard PLC stations.
- The Bandwidth monitoring utility, which is used to verify the distribution of utilities in the processor.
- The Replace faulty device utility, which allows the remote device configuration to be saved in the module. In case of breakdown, another installed blank module can be restarted with the configuration parameters of the previous one.

Characteristics

Maximum Capacity

The maximum frame size depends on the type of transaction:
- In synchronous messaging, the maximum frame size is 256 bytes.
- In asynchronous messaging, the maximum frame size is 1 Kbyte.

The Ethernet channel of the TSX P57 5634 is used:
- to manage 64 TCP connections using the port 502 messaging utility,
- to scan up to a maximum of 128 devices using the I/O Scanning utility,
- to be the address server for a maximum of 128 devices,

The processor is used:
- for X-Way synchronous messaging on TCP/IP (UNI-TE server):
  - 800 messages per second,
- in the case of asynchronous X-Way messaging on TCP/IP:
  - between 600 and 1200 messages per second (number varies depending on the size of the messages, the number of clients and the application execution time).

I/O Scanning Utility

The channel can scan a maximum of 128 remote devices.

For the same station, the application can process:
- a maximum total volume of inputs to be scanned of 4 Kwords,
- a maximum total volume of outputs to be scanned of 4 Kwords.

Global Data Utility

The user interface is a PLC variable zone defined in configuration.
The Ethernet link:
- can publish a variable of between 1 and 512 words,
- can subscribe between 1 and 64 variables. The total data cannot exceed 2Kwords.

Replace Faulty Equipment

The coprocessor reserves a 512 Kbytes zone for this function.

- Up to 128 remote devices can be configured in the DHCP address server utility.
- The 128 remote devices should share the 512 kb reserved for their parameters.

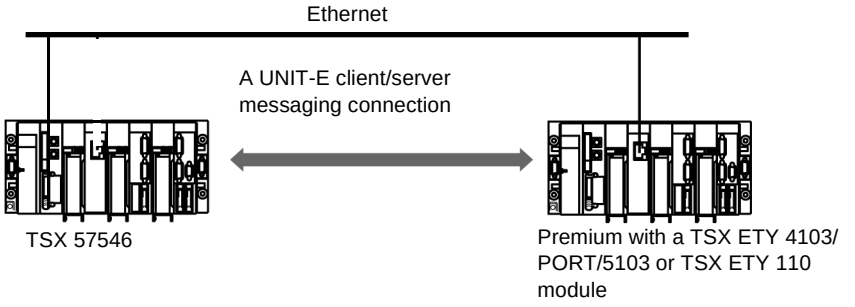
Type of Connections Supported

At a Glance

The Ethernet channel of the TSX P57 5634 authorizes a maximum of 16 HTTP connections in parallel and a maximum of 64 connections in parallel over TCP/IP.

Connection to a Premium

Between two Premium PLCs using UNI-TE messaging on the TCP/IP profile, the channel of the TSX P57 5634 only allows one connection in client/server mode.

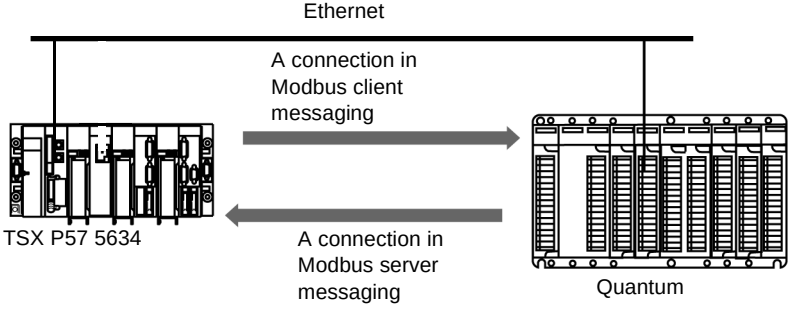

Ethernet
A UNIT-E client/server messaging connection
TSX 57546
Premium with a TSX ETY 4103/ PORT/5103 or TSX ETY 110 module

Connection to a Quantum

Between a Premium and a Quantum PLC using Modbus messaging on the TCP/IP profile, the Ethernet channel of the TSX P57 5634 allows:

- a single connection in Modbus client mode,
- a single connection in Modbus server mode.

Example

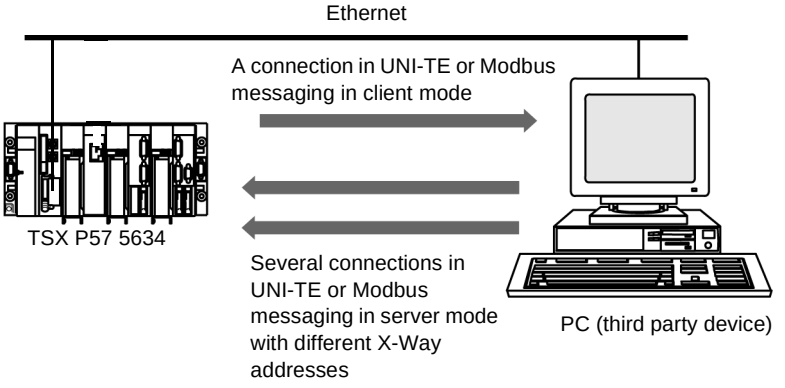


Connection to a Third Party Device

Between a Premium PLC and a third party device, the Ethernet channel of the TSX P57 5634 allows:

- a single connection in UNI-TE or Modbus client mode,
- several connections in UNI-TE or Modbus server mode.

Example


Ethernet
A connection in UNI-TE or Modbus messaging in client mode
TSX P57 5634
Several connections in UNI-TE or Modbus messaging in server mode with different X-Way addresses
PC (third party device)

Note: It is optional to give an X-Way address to the Ethernet link of the TSX P57 5634:
Without an X-Way address, it cannot participate in message exchanges with other X-Way stations. It can nevertheless be connected to P-Unit and receive Modbus messaging

Performance of I/O Scanning Utility

At a Glance

The performance data given below are those of the Ethernet channel of the TSX P57 5634 when using the I/O Scanning utility.

Restart Time for an I/O Scanning Configuration

This time corresponds to the time between the power up of the complete configuration and the moment when all the remote inputs/outputs become operational (the status bits are activated, the word bits %IWr.m.c.l to %IWr.m.c.4 = 1).
Values are given in seconds:

- T= 35 s, if the module the channel is used as a DHCP server to connect the scanned devices.
- T = 17 s, if the scanned devices use another DHCP server.

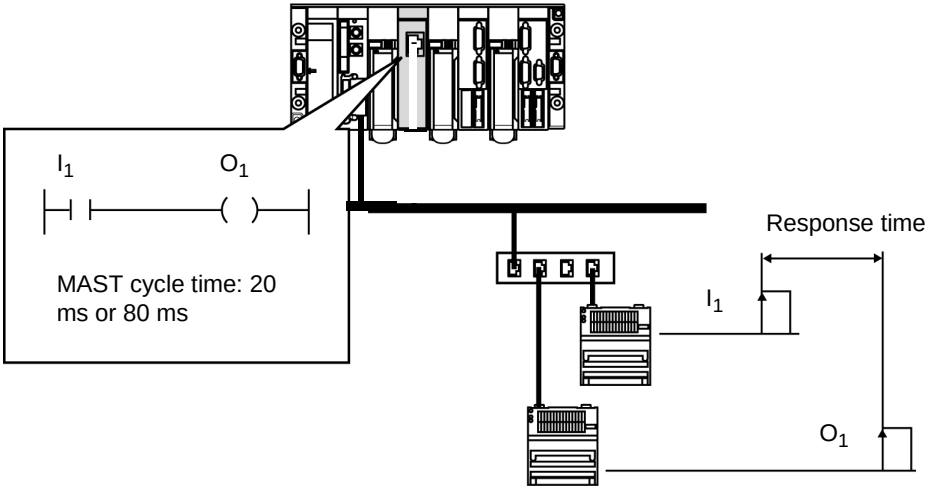
Input/Output Restart Time

This time corresponds to the time between the power up of the remote input/output and the moment when all the status bits are activated (word bits %IWr.m.c.l to %IWr.m.c.4 = 1).
The value is given in seconds:

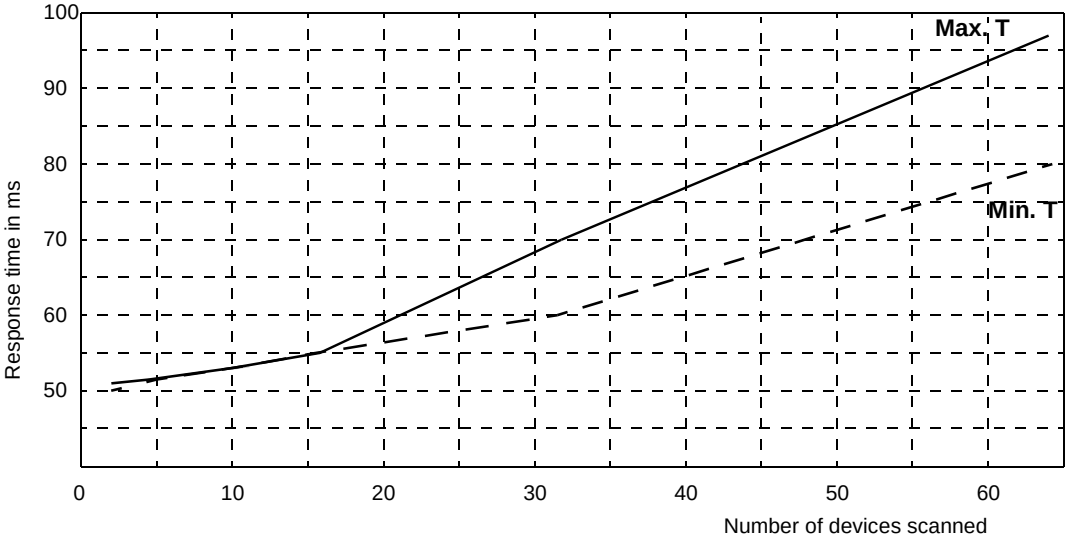
- T = 5 s

Application Response Time

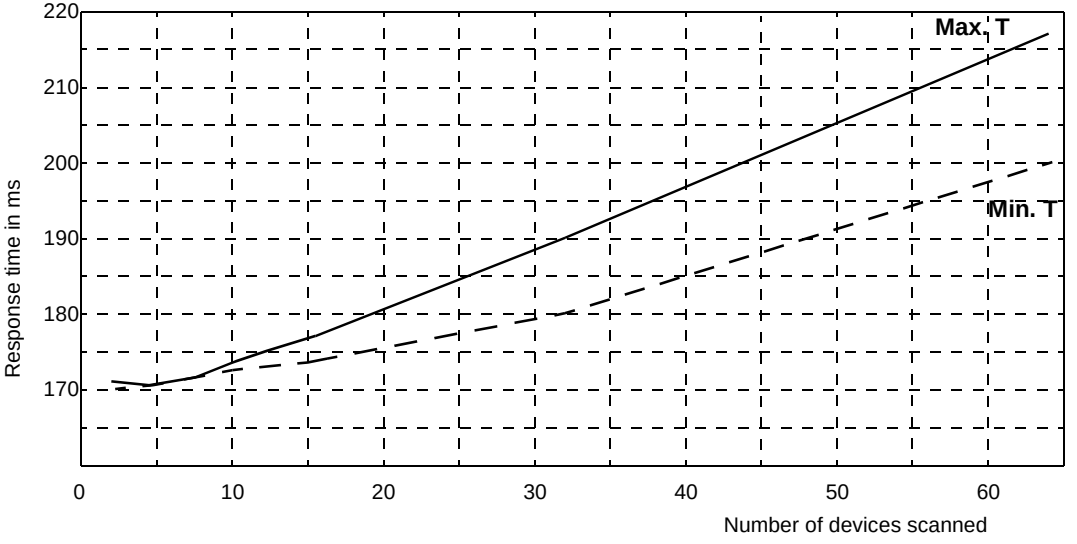
This time corresponds to the elapsed time between the acquisition of a remote input and the positioning of a remote output.
This is a logic response time, which does not take filtering time and actuator and sensor interface response times into account.
This is an example of time elapsed from acquiring an input to the positioning of an output:



Response time with a cycle of 20 ms



Response time with a cycle of 80 ms



Global Data Utility Performances

At a Glance

The values shown below are given to evaluate the Global Data utility performance on the Ethernet channel of the TSX P57 5634.

Definition

Global Data return time:
This time corresponds to the time elapsed between the publication of a variable value by the local PLC application, the subscription by a remote PLC application, the publication of the same value by the remote PLC application and the subscription by the local PLC application.

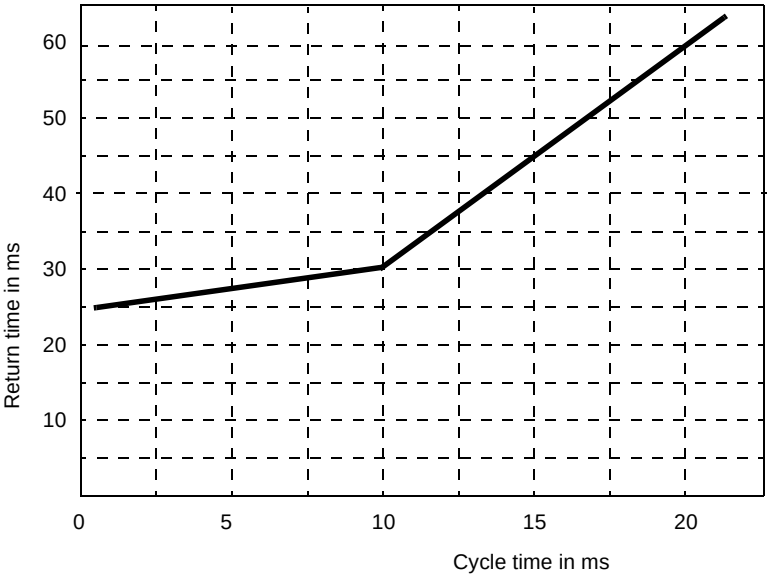
Values

Measurement conditions:

- The cycle time for local and remote PLC applications are identical.
- Only one variable is exchanged in each direction.

Result:

PLC cycle time	Return time
>= 10 ms	3 times the PLC cycle time
= 5 ms	5 to 6 times the PLC cycle time

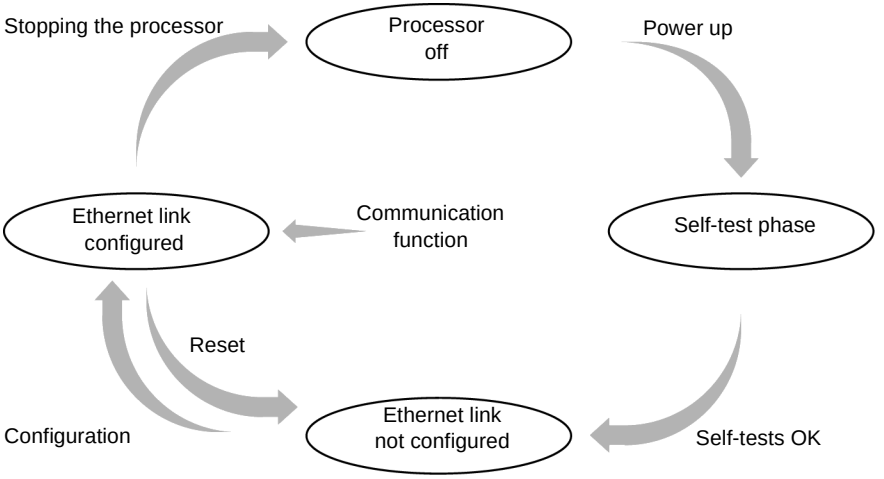


Operating Modes of the Ethernet Channel of the TSX P57 5634

At a Glance

The following diagram describes the operating modes of the Ethernet channel of the TSX P57 5634.

General Diagram



Operation

- After power-up, the coprocessor carries out self-testing. During this phase, the STS LED is lit. After the self tests, the STS LED switches off.
- When the configuration is received, the Ethernet channel resets the current communication to zero before configuring itself (terminates current exchanges, shuts down TCP connections).
  The channel is then operational. The STS LED is lit.
- The I/O Scanning and Global Data functions start when the PLC transfers to RUN mode. They stop when it switches to STOP mode.

Special Cases: Channel not Configured

If the Ethernet channel is not configured in the Unity Pro application, it takes the IP address built from its MAC address:
085.016.xxx.yyy where xxx and yyy are the last two numbers of the MAC address.
Example
The MAC address is (in hexadecimal): 00 80 F4 01 12 20
In this case the default IP address is (in decimal): 085.016.018.032

The channel also transmits BOOTP requests to obtain another IP address. These requests are sent until a DHCP server responds or until configuration via Unity Pro.

An Ethernet channel not configured allows you:
- to receive a connection from Unity Pro (loading application, etc.)
- to receive Modbus messaging.

If the STS LED flashes 5 times, then the IP address of the Ethernet channel is taken from the MAC address.
If the STS LED stays permanently on, then an IP address has been served by another network device. This IP address can be read in the channel's IP address language objects.

9.2 Configuration

At a Glance

This section describes the installation of the Ethernet channel of the TSX P57 5634 during its configuration.

What's in this Section?

This section contains the following topics:

Topic	Page
Configuration Screen of the Ethernet Channel of the TSX P57 5634	263
Type of Communication According to Connection Configuration	265
Configuration of TCP/IP Messaging	269
I/O Scanning Utility Configuration	271
Configuration of the Other Utilities of the TSX P57 5634	273

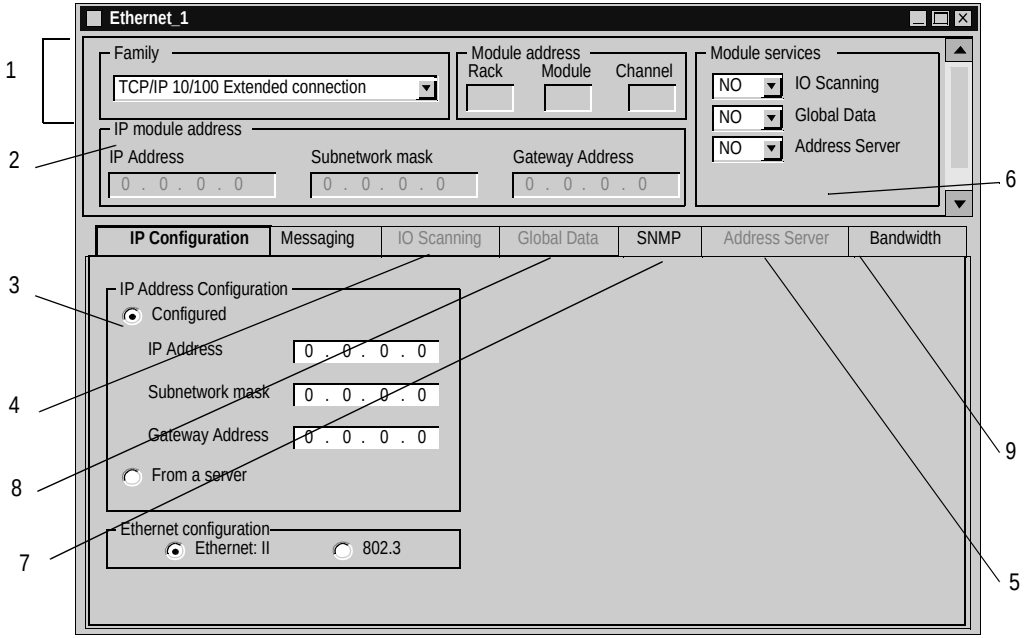
Configuration Screen of the Ethernet channel of the TSX P57 5634

Introduction

This screen, separated into two zones, is used to declare the communication channel and to configure the necessary parameters for an Ethernet link.

Figure

The screen dedicated to Ethernet communication is displayed as follows:



Elements and Functions

This table describes the various zones that make up the configuration screen:

Zone	Number	Function
common	1	Common part of the Ethernet communication configuration screens. This part enables you to choose the network family to be configured. When the network is associated with a module, the module address appears in the **Module address** zone.
specific	2	allows the display of the module address.
	3	enables the configuration of TCP/IP services (see ***p. 122***).
	4	allows configuration of the I/O Scanning utility (see ***p. 130***).
	5	allows configuration of the address server (see ***p. 135***).
	6	allows selection of the utilities used by the module.
	7	allows configuration of the SNMP utility (see ***p. 138***).
	8	allows configuration of the Global Data utility (see ***p. 142***).
	9	allows you to check that the utilities configured are compatible with the processing capacity of the Ethernet channel.

Type of Communication According to Connection Configuration

At a Glance

Depending on the connection configuration of the Ethernet channel of the TSX P57 5634, you can carry out messaging (see ***p. 127***).

- in mono-connection
- in multi-connection.

According to the type of protocol and access control management, multi-connection mode requires a specific configuration of the correspondence table.

Note: In the following, only examples of multi-connection will be dealt with. Furthermore, the emphasis is placed on communication between the coprocessor and a remote PC device containing several applications.

Configuration Rules

Several connections can be configured with the same IP address. They must be defined with the same protocol, the same access rights, and the same connection mode.

In the case of a Modbus connection, only two connections can be configured with the same IP address. Addresses associated with these connections are:

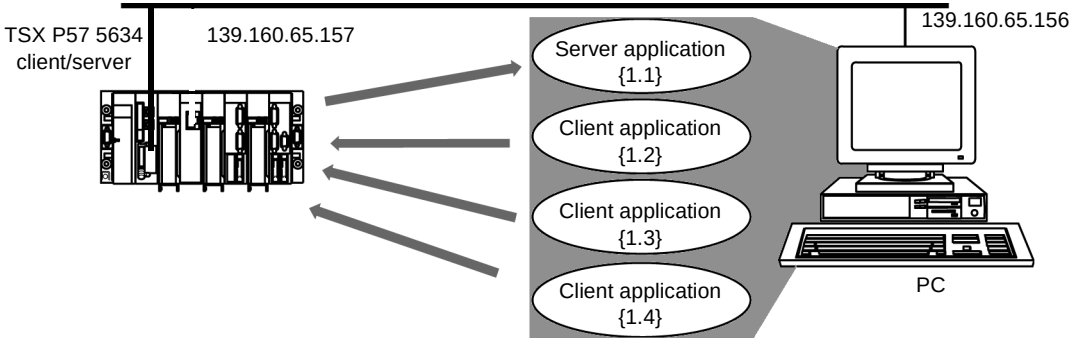
- an X-Way address greater than 100 (for example: {2.103}) for the Modbus client connection,
- no X-Way address for the server Modbus connections.

Multi-Connection in UNI-TE Protocol with Access Management

In this example, the PC contains four applications with a unique X-Way address and one single IP address:

- The coprocessor opens a connection and communicates with the address server application {1.1}.
- Each of the other client applications with the address {1.2}, {1.3}, {1.4} is authorized to open a connection and communicate with the coprocessor.

Exchanges are carried out according to the UNI-TE protocol and the coprocessor's access control utility is enabled.



In order to implement this example, you must:

- activate connection management by checking the coprocessor's **Access control** box,
- configure communication from the coprocessor to the PCís server application in the table
  - **X-Way address**: 1.1
  - **IP address**: 139.160.65.156
  - **Access**: authorized (cell checked)
  - **Mode**: Multi
- configure communication of each of the PCís client applications to the server coprocessor in the table:
  - **X-Way address**: 1.2 and 1.3 and 1.4
  - **IP address**: 139.160.65.156
  - **Access**: authorized (cell checked)
  - **Mode**: Multi

Multi-Connection in UNI-TE Protocol without Access Management

This example is the same as the previous one, except that access control is not configured.
In this case, if the application {1.1} is the only server application, the coprocessor's correspondence table only contains the following line:

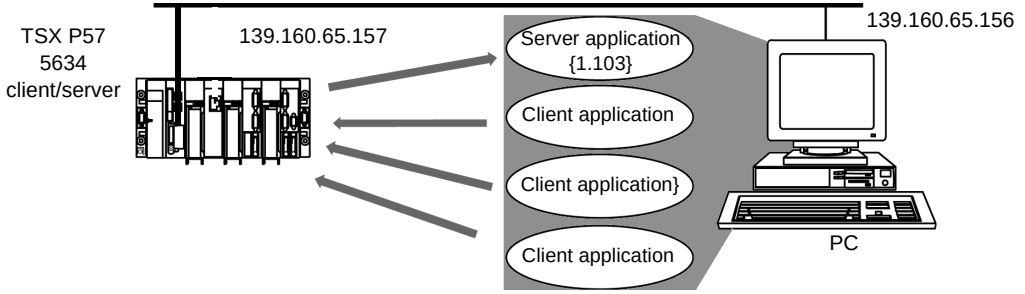
- **X-Way address**: 1.1
- **IP address**: 139.160.65.156
- **Access**: the cell is grayed out
- **Mode**: Multi

Multi-Connection in Modbus Protocol with Access Management

In this example, the PC contains four applications. The server application has an imaginary X-Way address and the other client applications do not need an X-Way address:

- The coprocessor opens a connection and communicates with the server application with the imaginary address {1.103}.
- Each of the client applications has no address but is authorized to open a connection and communicates with the Ethernet channel of the TSX P57 5634.

Exchanges are carried out according to the Modbus protocol and the coprocessor's access control utility is enabled.



In order to implement this example, you must:

- activate connection management by checking the coprocessor's **Access control** box,
- configure communication from the coprocessor to the PCís server application in the table
  - **X-Way address**: 1.103 (address between 100 and 163 for the Modbus protocol)
  - **IP address**: 139.160.65.156
  - **Access**: the cell is grayed out
  - **Mode**: Multi
- configure communication of all the PCís client applications to the server coprocessor in the table:
  - **X-Way address**: empty
  - **IP address**: 139.160.65.156
  - **Access**: authorized (allows you to specify that other applications are authorized to connect and communicate)
  - **Mode**: Multi

Note: If you want to prevent connection by client applications you must configure
- **X-Way address**: empty
- **IP address**: 139.160.65.156
- **Access**: not authorized (cell unchecked)
- **Mode**: Multi

Multi-Connection in Modbus Protocol without Access Management

This example is the same as the previous one, except that access control is not configured.

In this case, if the application {1.103} is the only server application, the coprocessor's correspondence table only contains the following line:
- **X-Way address**: 1.103 (address between 100 and 163 for the Modbus protocol)
- **IP address**: 139.160.65.156
- **Access**: the cell is grayed out
- **Mode**: Multi

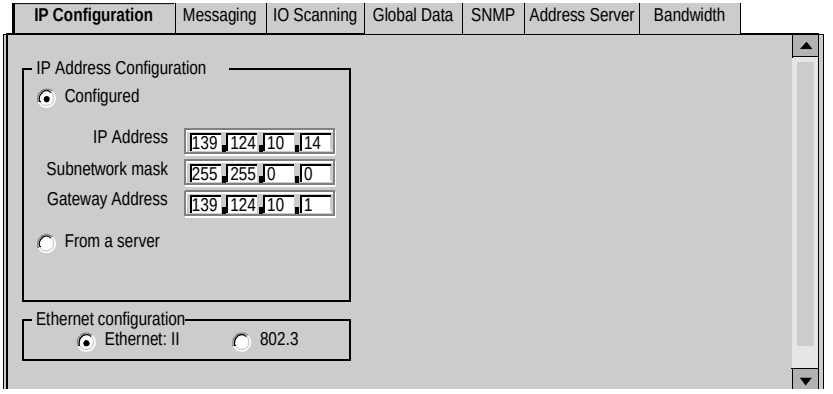
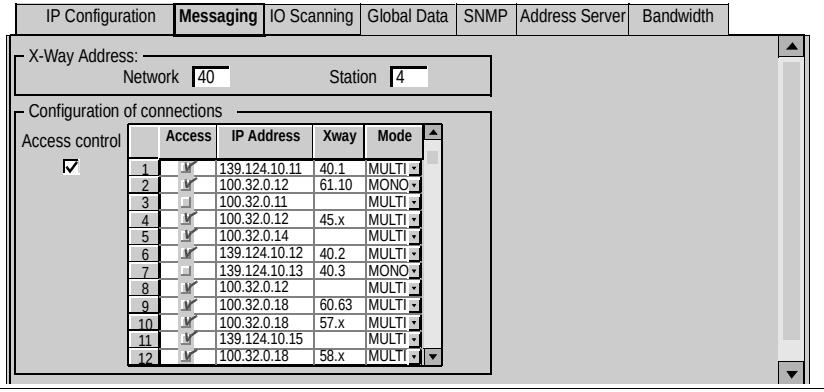
Configuration of TCP/IP Messaging

Introduction

In order to use the channel of the TSX P57 5634 module to communicate on Ethernet, it is necessary to set the messaging configuration parameters (see ***p. 123***).
Messaging is configured in the two windows accessible by the tabs: I**P Configuration** and **Messaging**.

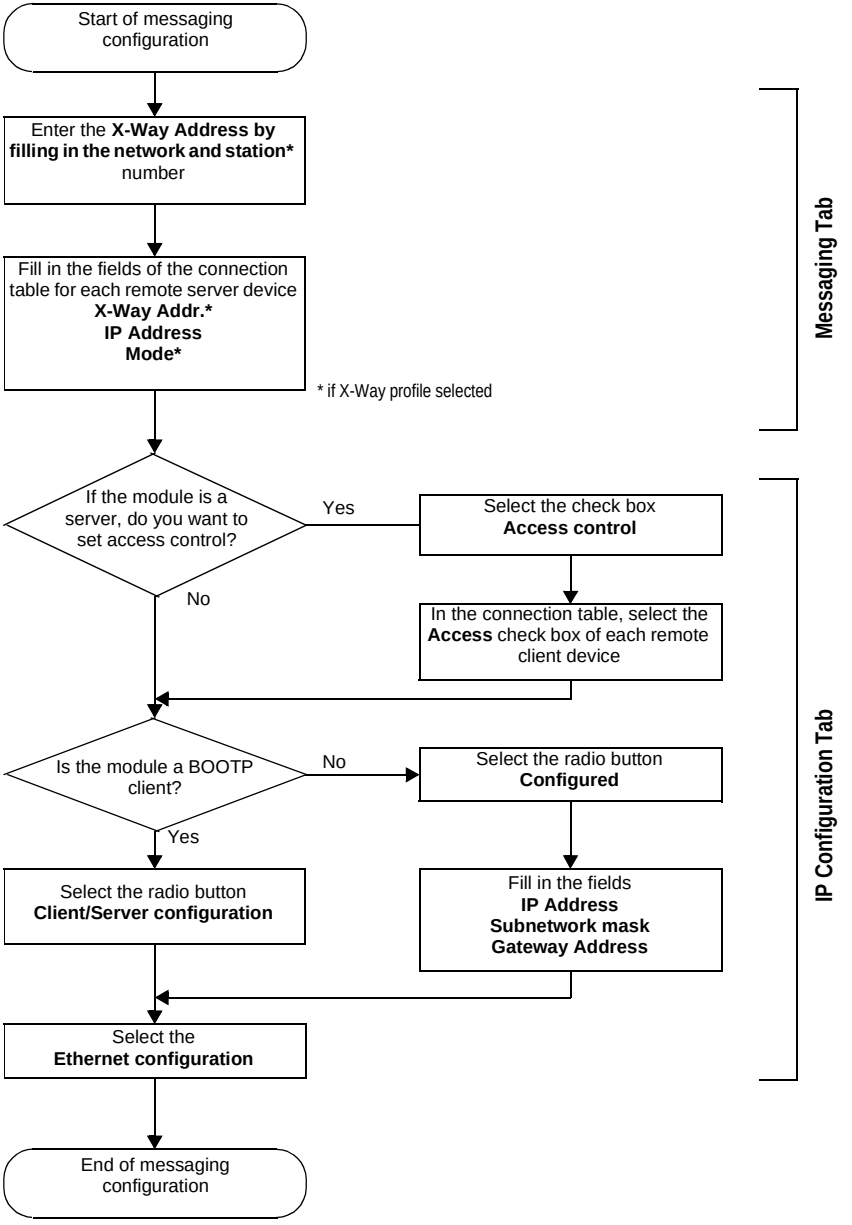
How to Access the Messaging

The procedure for accessing the configuration parameters for TCP/IP utilities is as follows.

Step	Action
1	Access the module configuration screen.
2	Select the **IP Configuration** tab. **Result** 
3	Select the **Messaging** tab. **Result** 

How to Configure the Messaging

The following procedure gives the configuration principle.


Start of messaging configuration
Enter the **X-Way Address by filling in the network and station*** number
Fill in the fields of the connection table for each remote server device
X-Way Addr.*
IP Address
Mode*
* if X-Way profile selected
Messaging Tab
If the module is a server, do you want to set access control?
Yes
Select the check box **Access control**
No
In the connection table, select the **Access** check box of each remote client device
Is the module a BOOTP client?
No
Select the radio button **Configured**
Yes
Select the radio button **Client/Server configuration**
Fill in the fields
IP Address
Subnetwork mask
Gateway Address
Select the **Ethernet configuration**
End of messaging configuration
IP Configuration Tab

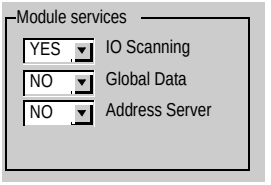
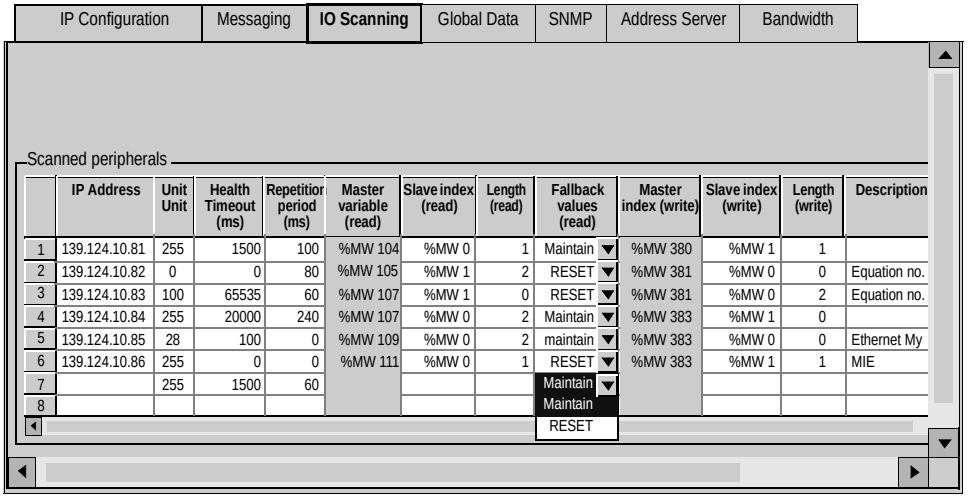
I/O Scanning Utility Configuration

Introduction

In order to use the Ethernet coprocessor to control remote I/Os, it is necessary to set the configuration parameters of the I/O Scanning utility (see ***p. 130***).

How to Access I/O Scanning

The procedure for accessing the configuration parameters for the I/O Scanning utility is as follows.

Step	Action
1	Access the module configuration screen.
2	In the **Module utilities** zone select the **I/O Scanning** check box.  The **I/O Scanning** tab is no longer grayed out.
3	Select the **I/O Scanning** tab. **Result** 

	IP Address	Unit Unit	Health Timeout (ms)	Repetition period (ms)	Master variable (read)	Slave index (read)	Length (read)	Fallback values (read)	Master index (write)	Slave index (write)	Length (write)	Description
1	139.124.10.81	255	1500	100	%MW 104	%MW 0	1	Maintain	%MW 380	%MW 1	1	
2	139.124.10.82	0	0	80	%MW 105	%MW 1	2	RESET	%MW 381	%MW 0	0	Equation no.
3	139.124.10.83	100	65535	60	%MW 107	%MW 1	0	RESET	%MW 381	%MW 0	2	Equation no.
4	139.124.10.84	255	20000	240	%MW 107	%MW 0	2	Maintain	%MW 383	%MW 1	0	
5	139.124.10.85	28	100	0	%MW 109	%MW 0	2	maintain	%MW 383	%MW 0	0	Ethernet My
6	139.124.10.86	255	0	0	%MW 111	%MW 0	1	RESET	%MW 383	%MW 1	1	MIE
7		255	1500	60				Maintain				
8								Maintain				
								RESET				

How to Configure I/O Scanning

The following procedure gives the configuration principles for the I/O Scanning utility.

Step	Action
1	For each device, enter the **IP Address**.
2	Enter for each device, if necessary, the **Unit ID** Modbus slave address.
3	Enter, if required, a health Time-out value in ms.
4	Enter the **repetition periods** of the remote device (scanning period of the slave).
5	For each device, enter the address of the variables read in each slave **Slave index (read)**.
6	For each device, enter the number of words to be sent in read format in **Length (read)**.
7	Select the input fallback mode in **Fallback value (read)**.
8	For each device, enter the address of the variables written in each slave **Slave index (write)**.
9	For each device, enter the number of words to be sent in write format in **Length (write)**.
10	For each device enter, if necessary, a comment in **Description**.

How to Configure a Specific Read and Write Scenario

When scanned, certain devices, such as TSX ETY modules, do not support simultaneous read/write requests. In this case, to read/write inputs/outputs, the following procedure must be performed.

Step	Action
1	Enter the **IP Address** of the device
2	If necessary, enter the deviceís **Unit ID** Modbus slave address.
3	Select the scanning period of the slave.
4	Enter the address of the read variables of the slave **Slave index (read)**.
5	Enter the number of words to be sent in read format in **Length (read)**.
6	Enter **0** in **Slave index (write)**.
7	Enter **0** in **Length (write)**.
8	On the following line, enter the same **IP Address**
9	Enter, if necessary, the same **Unit ID** Modbus slave address.
10	Select the same period.
11	Enter **0** in **Slave index (read)**.
12	Enter **0** in **Length (read)**.
13	Enter the write destination address in **Slave index (write)**.
14	Enter the number of words to be sent in read format in **Length (write)**.

Configuration of the Other Utilities of the TSX P57 5634

Introduction

The other available utilities of the Ethernet channel of the TSX P57 5634 are configured using screens that are entirely the same as those of the modules TSX ETY 4103/PORT/5103.

These utilities are as follows:

- Address Server (see ***p. 223***) utility
- Global Data (see ***p. 225***) utility
- SNMP (see ***p. 227***) utility
- Bandwidth monitoring (see ***p. 236***) utility

9.3 Debugging

At a Glance

This section describes the installation of the Ethernet channel of the TSX P57 5634 during its debugging.

What's in this Section?

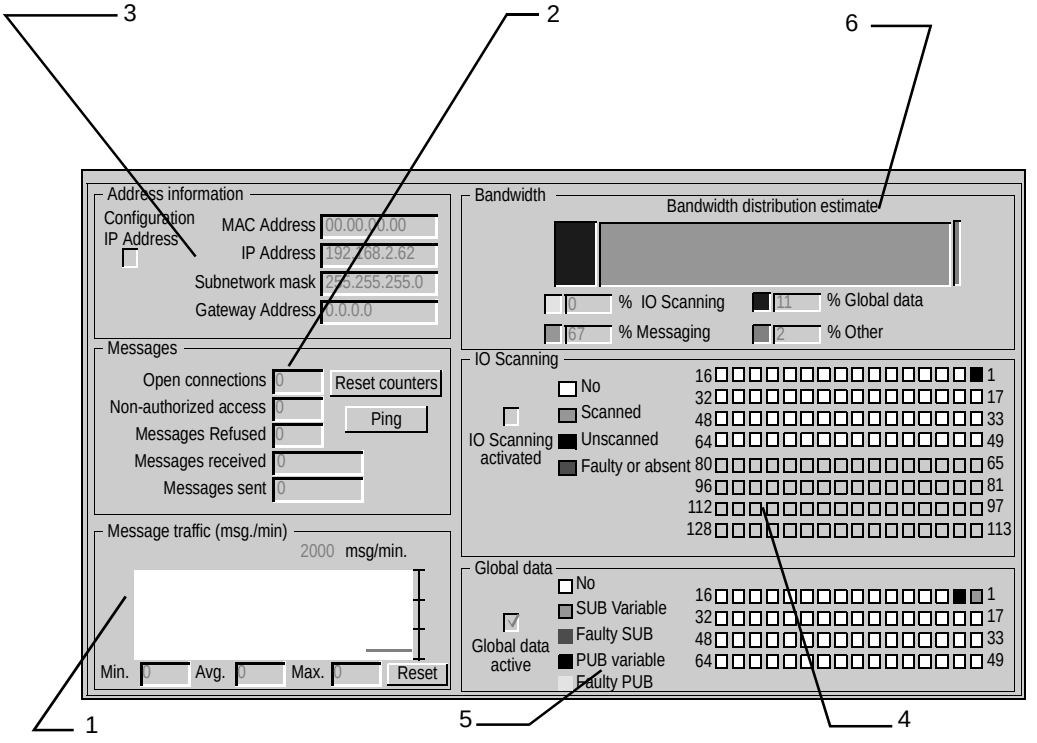
This section contains the following topics:

Topic	Page
Ethernet Channel Debugging Screen	275
General Debugging Parameters	277
TCP/IP Address Information	278
How to Test the TCP/IP Communication with the Ping Request	279
Debugging Parameters for the I/O Scanning Utility	281
Debugging Parameters for the Global Data Utility	282
Bandwidth Control Diagnostic Parameters	283

Ethernet Channel Debugging Screen

Introduction This screen, separated into six zones, allows debugging via an Ethernet link.

Figure The screen dedicated to Ethernet communication is displayed as follows:



Elements and Functions

This table describes the different zones that make up the debugging screen:

Number	Zone	Function
1	Message traffic	allows the graphical display of the number of messages processed by the module:
2	Messages	allows the display of the number of unacknowledged or refused messages and connections. The counter values can be reinitialized using the **Init Counters** button. A **Ping** button is used to access the communication test.
3	Addresses	is used to display the various TCP/IP addresses:
4	I/O Scanning	allows display of the status for each remote input/output module.
5	Global Data	allows display of the status for Global Data variables.
6	Bandwidth	is used to display the Bandwidth diagnostics

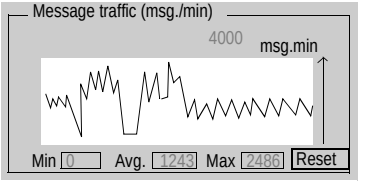
General Debugging Parameters

Introduction

The general debugging parameters are grouped together in two windows:
- the **Message traffic** window,
- the **Messages** window.

Message Traffic

The window is displayed as below:

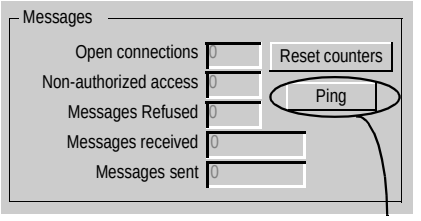


It indicates graphically the number of messages per minute processed by the module (send and receive). For better display, the scale automatically adapts to the flow rate.

The **Reset** button resets the three counters **Min.**, **Av.** and **Max.** to zero.

Messages

The window is displayed as below:



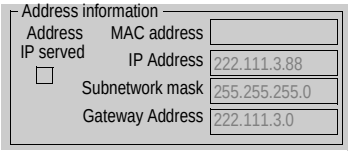
This window relates to TCP/IP messaging:
- the number of connections opened,
- the number of unauthorized accesses,
- the number of messages refused, received and sent.

You can reset these counters to zero by clicking on the **Init counter** button.
The **Ping** (see ***p. 279***) button is used to access the communication test.

TCP/IP Address Information

At a Glance

The window is displayed as below:



It specifies the configuration data of the IP address:

- **MAC address**: unique fixed address for a module
- **IP Address**
- **Subnetwork mask**
- **Gateway Address**: address of the gateway

A box indicates if the IP address is served or configured.

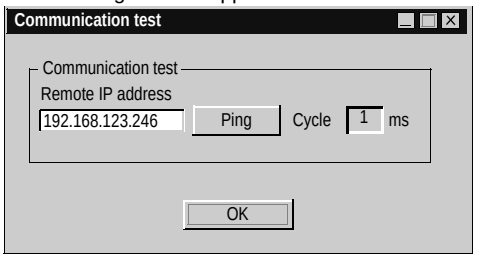
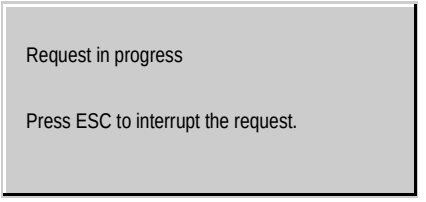
How to Test the TCP/IP Communication with the Ping Request

At a Glance

This page indicates the procedure for testing TCP/IP communication from a **Ping** request.

Procedure

The following procedure is used to send the Ping request and therefore to test the correct routing of information between two devices.

Step	Action
1	From the main screen, click on the **Ping** button. The following window appears: 
2	Click on the **Ping** button and enter the address of the station to be queried using the **Remote IP address** field.
3	Press the **OK** button. The following window appears:  **Result** If the exchange is successful, the following window appears: The send/return time of the message in ms appears in the **Period** field:

Response Type

The following table groups together the various types of possible responses to the Ping request.

If the response is	then
positive	The windows records the time it takes the message to be sent and return in ms. a window appears with the message **Exchange successful**.
negative	a window with the message **Exchange incorrect** specifies that the remote device was not reached in the network architecture.

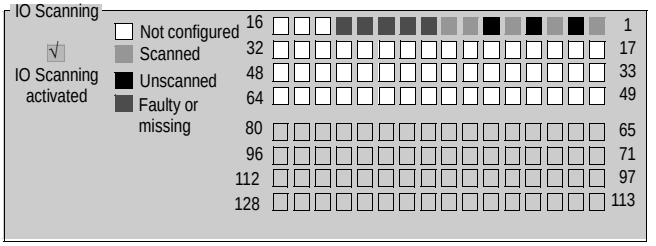
Debugging Parameters for the I/O Scanning Utility

At a Glance

When the I/O Scanning utility is activated, the status of each configured device is displayed on the screen.

I/O Scanning

The window is displayed as below:



A device referenced in the I/O Scanning configuration tab can have the following states:

- **Scanned**: green,
- **Not configured**: white,
- **Unscanned**: black (caused by I/O Scanning utility not being activated, none selected in configuration),
- **Faulty or absent**: red,

Note: In the cases of **Not configured** and **Unscanned**, no Modbus request is generated towards the device.

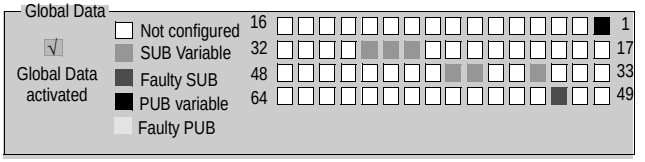
Debugging Parameters for the Global Data Utility

Introduction

When the Global Data utility is activated, the status of a Global Data variable is displayed on the screen.

Global Data

The window is displayed as below:



A Global Data variable can have the following status:

- **Not configured**: white,
- **SUB variable**: subscribed variable received in the health timeout limit, green,
- **Faulty SUB**: subscribed variable not received in the health time out limit, red,
- **PUB variable**: published variable, green,
- **Faulty PUB**: published variable not updated within the allotted period, yellow,

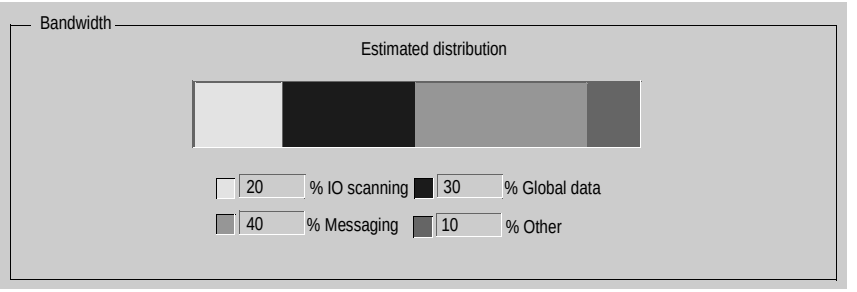
Bandwidth Control Diagnostic Parameters

Introduction

When bandwidth control is activated, the load of the coprocessor is displayed on the screen.

Bandwidth

The window is displayed as below:



This graphic displays the actual load distribution, between I/O Scanning , Global Data, Messaging and other utilities:

- **%IO Scanning**: yellow,
- **% Global Data**: blue,
- **% Messaging**: green,
- **% Other**: gray.

Return to configuration (see ***p. 236***) if you wish to modify this distribution.

Ethernet Language Objects

10

At a Glance

This section describes the language objects associated with the Ethernet communication modules.

What's in this Chapter?

This chapter contains the following sections:

Section	Topic	Page
10.1	Language Objects and IODDT of Ethernet Communication	286
10.2	The Language Objects and Generic IODDT Applicable to all Communication Protocols	291
10.3	The Language Objects and IODDTs Associated with Ethernet Communication	295
10.4	The IODDT Type T_GEN_MOD Applicable to all Modules	307
10.5	Ethernet Configuration Language Objects	308

10.1 Language Objects and IODDT of Ethernet Communication

At a Glance

This section provides a general overview of language objects and IODDT of Ethernet communication

What's in this Section?

This section contains the following topics:

Topic	Page
Description of Language Objects for Ethernet Communication	287
Implicit Exchange Language Objects Associated with the Application-Specific Function	288
Explicit Exchange Language Objects Associated with the Application-Specific Function	289

Description of Language Objects for Ethernet Communication

General

Ethernet communication has five IODDTs :

- T_COM_STS_GEN which applies to all communication protocols,
- T_COM__ETY_1X0 specific to the modules ETY_110 and ETY_120.
- T_COM__ETY_210 specific to the module ETY_210.
- T_COM__ETYX103 specific to the module ETY_4103/PORT/5103.
- T_COM__ETHCOPRO specific to the Ethernet channel of the processor TSX P 57 5634.

Note: IODDT variables can be created in two different ways:
- Using the **I/O objects** tab,
- Data Editor.

Types of Language Objects

Each IODDT has a set of language objects that is used to control and check the operation of the IODDT.

There are two types of language objects:
- **implicit exchange objects**, which are exchanged automatically on each cycle turn of the task associated with the module
- **explicit exchange objects**, which are exchanged at the request of the application ,using explicit exchange instructions

Implicit exchanges concern the states of modules, communication signals, slaves, etc.
Explicit exchanges are used to set parameters and diagnose the module.

Implicit Exchange Language Objects Associated with the Application-Specific Function

At a Glance

An integrated application-specific interface or the addition of a module automatically enhances the language objects application used to program this interface or module.
These objects correspond to the input/output images and software data of the module or integrated application-specific interface.

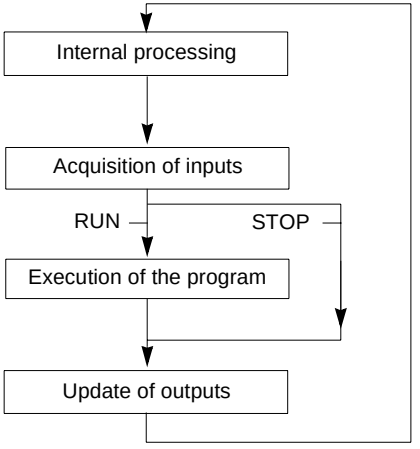
Reminders

The module inputs (%I and %IW) are updated in the PLC memory at the start of the task, the PLC being in RUN or STOP mode.
The outputs (%Q and %QW) are updated at the end of the task, only when the PLC is in RUN mode.

Note: When the task occurs in STOP mode, either of the following are possible, depending on the configuration selected:
- Outputs are set to fallback position (fallback mode),
- Outputs are maintained at their last value (maintain mode).

Figure

The following diagram shows the operating cycle of a PLC task (cyclical execution).



Explicit Exchange Language Objects Associated with the Application-Specific Function

At a Glance

Explicit exchanges are exchanges performed at the user program's request, and using instructions:

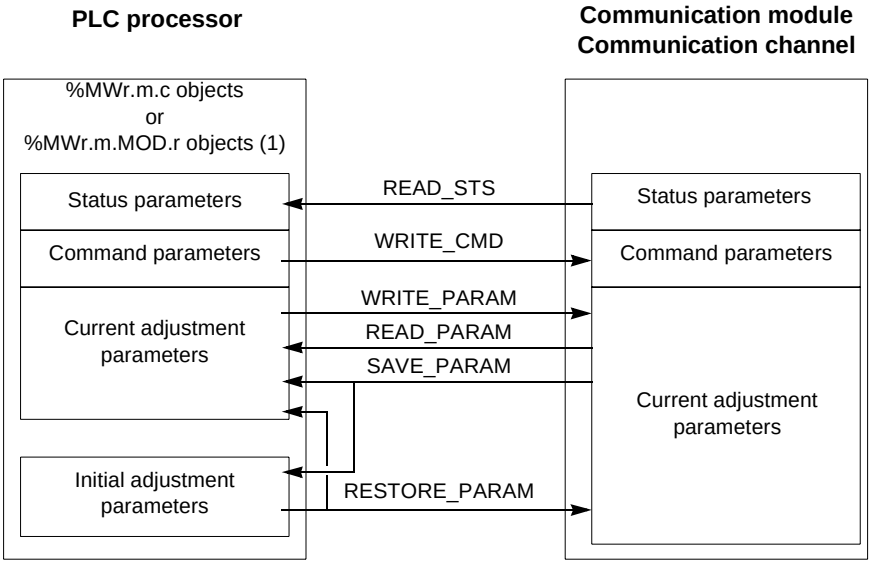
- READ_STS (read status words),
- WRITE_CMD (write command words),
- WRITE_PARAM (write adjustment parameters),
- READ_PARAM (read adjustment parameters),
- SAVE_PARAM (save adjustment parameters),
- RESTORE_PARAM (restore adjustment parameters).

These exchanges apply to a set of %MW objets of the same type (status, commands or parameters) that belong to a channel.

Note: These objects provide information about the module (e.g.: type of channel fault, etc.), can be used to command them (e.g.: switch command) and to define their operating modes (save and restore adjustment parameters in the process of application).

General Principle for Using Explicit Instructions

The diagram below shows the different types of explicit exchanges that can be made between the processor and module.



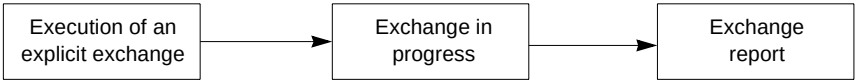
(1) Only with READ_STS and WRITE_CMD instructions.

Managing Exchanges

During an explicit exchange, it is necessary to check its performance in order that data is only taken into account when the exchange has been correctly executed.

To do this, two types of information is available:
- information concerning the exchange in progress,
- the exchange report.

The following diagram describes the management principle for an exchange



10.2 The Language Objects and Generic IODDT Applicable to all Communication Protocols

At a Glance

This section presents the language objects and generic IODDT applicable to all communication protocols.

What's in this Section?

This section contains the following topics:

Topic	Page
Details of IODDT Implicit Exchange Objects of Type T_COM_STS_GEN	292
Details of IODDT Explicit Exchange Objects of Type T_COM_STS_GEN	293

Details of IODDT Implicit Exchange Objects of Type T_COM_STS_GEN

At a Glance

The following table presents the IODDT implicit exchange objects of type T_COM_STS_GEN applicable to all communication protocols except Fipio.

Error Bit

The table below presents the meaning of the error bit CH_ERROR (%Ir.m.c.ERR).

Standard symbol	Type	Access	Meaning	Address
CH_ERROR	EBOOL	R	Communication channel error bit.	%Ir.m.c.ERR

Details of IODDT Explicit Exchange Objects of Type T_COM_STS_GEN

At a Glance

This section presents the T_COM_STS_GEN type IODDT explicit exchange objects applicable to all communication protocols except Fipio. It includes the word type objects whose bits have a specific meaning. These objects are presented in detail below.
Sample Variable Declaration: **IODDT_VAR1** of type T_COM_STS_GEN.

Observations

- In general, the meaning of the bits is given for bit status 1. In specific cases an explanation is given for each status of the bit.
- Not all bits are used.

Execution Flags of an Explicit Exchange: EXCH_STS

The table below shows the meaning of channel exchange control bits from channel EXCH_STS (%MWr.m.c.0).

Standard symbol	Type	Access	Meaning	Address
STS_IN_PROGR	BOOL	R	Reading of channel status words in progress.	%MWr.m.c.0.0
CMD_IN_PROGR	BOOL	R	Current parameter exchange in progress.	%MWr.m.c.0.1
ADJ_IN_PROGR	BOOL	R	Adjustment parameter exchange in progress.	%MWr.m.c.0.2

Explicit Exchange Report: EXCH_RPT

The table below presents the meaning of the exchange report bits EXCH_RPT (%MWr.m.c.1).

Standard symbol	Type	Access	Meaning	Address
STS_ERR	BOOL	R	Reading error for channel status words.	%MWr.m.c.1.0
CMD_ERR	BOOL	R	Error during command parameter exchange.	%MWr.m.c.1.1
ADJ_ERR	BOOL	R	Error during adjustment parameter exchange.	%MWr.m.c.1.2

Standard Channel Faults, CH_FLT

The table below shows the meaning of the bits of the status word CH_FLT (%MWr.m.c.2). Reading is performed by a **READ_STS**(**IODDT_VAR1**).

Standard symbol	Type	Access	Meaning	Address
NO_DEVICE	BOOL	R	No device is working on the channel.	%MWr.m.c.2.0
1_DEVICE_FLT	BOOL	R	A device on the channel is faulty.	%MWr.m.c.2.1
BLK	BOOL	R	Terminal block fault (not connected).	%MWr.m.c.2.2
TO_ERR	BOOL	R	Time out error (defective wiring).	%MWr.m.c.2.3
INTERNAL_FLT	BOOL	R	Internal error or channel self-testing.	%MWr.m.c.2.4
CONF_FLT	BOOL	R	Different hardware and software configurations.	%MWr.m.c.2.5
COM_FLT	BOOL	R	Problem communicating with the PLC.	%MWr.m.c.2.6
APPLI_FLT	BOOL	R	Application error (adjustment or configuration error).	%MWr.m.c.2.7

10.3 The Language Objects and IODDTs Associated with Ethernet Communication

At a Glance

This section shows the language objects and IODDTs associated with Ethernet communication.

What's in this Section?

This section contains the following topics:

Topic	Page
Details of Implicit Exchange Objects of the IODDT of Type T_COM_ETY_1X0	296
Details of Explicit Exchange Objects of the IODDT of Type T_COM_ETY_1X0	297
Details of Implicit Exchange Objects of the IODDT of Type T_COM_ETYX103	298
Details of Explicit Exchange Objects of the IODDT of Type T_COM_ETYX103	299
Details of Explicit Exchange Objects of the IODDT of Type T_COM_WMY_100	301
Details of Implicit Exchange Objects of the IODDT of Type T_COM_ETHCOPRO	303
Details of Explicit Exchange Objects of the IODDT of Type T_COM_ETHCOPRO	305

Details of Implicit Exchange Objects of the IODDT of Type T_COM_ETY_1X0

At a Glance

The IODDT of type T_COM_ETY_1X0 has implicit exchange objects, which are described below. This type of IODDT applies to the modules TSX ETY 110 and TSX ETY 120.

Example of declaring a variable: IODDT_VAR1 of type T_COM_ETY_1X0
Generally speaking, the meaning of bits is given for state 1 of this bit. In specific cases, the two states of the bit are explained.

List of Implicit Exchange Objects

The table below shows the implicit exchange objects of the IODDT of type T_COM_ETY_1X0 which applies to the two modules TSX ETY110/120.

Standard symbol	Type	Access	Meaning	Address
CH_ERROR	EBOOL	R	Line error bit.	%Ir.m.c.ERR
NET_STS	BOOL	R	Reception bit of common words of at least one of the remote stations	%Ir.m.c.0.0
REFRESH_ID_0 to REFRESH_ID_15	BOOL	R	Indicates that the common words of the station 0 to 15 are refreshed	%Ir.m.c.1.0 to %Ir.m.c.1.15
REFRESH_ID_16 to REFRESH_ID_31	BOOL	R	Indicates that the common words of the station 16 to 31 are refreshed	%Ir.m.c.2.0 to %Ir.m.c.2.15
REFRESH_ID_32 to REFRESH_ID_47	BOOL	R	Indicates that the common words of the station 32 to 47 are refreshed	%Ir.m.c.3.0 to %Ir.m.c.3.15
REFRESH_ID_48 to REFRESH_ID_63	BOOL	R	Indicates that the common words of the station 48 to 63 are refreshed	%Ir.m.c.4.0 to %Ir.m.c.4.15

WARNING

The update bit switches to 1 at the beginning of the PLC cycle if it receives common words from the corresponding station. At the end of the cycle the update bits automatically return to 0. Consequently, common words can only be considered valid if the update bit of the corresponding station is set to 1.
After power up, common words are set to value 0.

Failure to follow this precaution can result in death, serious injury, or equipment damage.

Details of Explicit Exchange Objects of the IODDT of Type T_COM_ETY_1X0

At a Glance

This part describes the explicit exchange objects of the IODDT of type T_COM_ETY_1X0 which applies to the two modules TSX ETY 110 and TSX ETY 120. It includes word-type objects whose bits have a special meaning. These objects are described in detail below.
Example of declaring a variable: IODDT_VAR1 of type T_COM_ETY_1X0

Remarks

- Generally speaking, the meaning of bits is given for state 1 of this bit. In specific case, each state of the bit is explained.
- Not all bits are used.

Explicit Exchange Indicators: EXCH_STS

The table below gives the meanings of the exchange control bits of the channel EXCH_STS (%MWr.m.c.0).

Standard symbol	Type	Access	Meaning	Address
STS_IN_PROGR	BOOL	R	Reading of status words of the channel in progress.	%MWr.m.c.0.0
CMD_IN_PROGR	BOOL	R	Exchange of parameters of command in progress	%MWr.m.c.0.1
ADJ_IN_PROGR	BOOL	R	Exchange of parameters of adjustment in progress	%MWr.m.c.0.2

Explicit Exchange Report: EXCH_RPT

The table below gives the meanings of the report bits EXCH_RPT (%MWr.m.c.1).

Standard symbol	Type	Access	Meaning	Address
STS_ERR	BOOL	R	Error in reading status words of the channel	%MWr.m.c.1.0
CMD_ERR	BOOL	R	Error when exchanging command parameters	%MWr.m.c.1.1
ADJ_ERR	BOOL	R	Error when exchanging adjustment parameters	%MWr.m.c.1.2

Standard Channel Faults, CH_FLT

The table below gives the meanings of the status word bits CH_FLT (%MWr.m.c.2). The reading is taken by a READ_STS (IODDT_VAR1).

Standard symbol	Type	Access	Meaning	Address
INTERNAL_FLT	BOOL	R	Internal or channel self-test fault	%MWr.m.c.2.4
APPLI_FLT	BOOL	R	Application fault (adjustment or configuration fault)	%MWr.m.c.2.7

Details of Implicit Exchange Objects of the IODDT of Type T_COM_ETYX103

Introduction

This part describes the implicit exchange objects of the IODDT of type T_COM_ETYX103 which applies to the modules TSX ETY 4103/PORT/5103. It includes word-type objects whose bits have a special meaning. These objects are described in detail below.

Example of declaring a variable: IODDT_VAR1 of type T_COM_ETYX103

List of Implicit Exchange Objects

The table below shows the implicit exchange objects of the IODDT of type T_COM_ETYX103 which applies to the modules TSX ETY4103/PORT/5103.

Standard symbol	Type	Access	Meaning	Number
CH_ERROR	EBOOL	R	Line error bit.	%Ir.m.c.ERR
REFRESH_IO_0 to REFRESH_IO_15	BOOL	R	Indicates that the Inputs/Outputs of the IO Scanning Utility from station 0 to 15 are refreshed	%IWr.m.c.1.0 to %IWr.m.c.1.15
REFRESH_IO_16 to REFRESH_IO_31	BOOL	R	Indicates that the Inputs/Outputs of the IO Scanning Utility from station 16 to 31 are refreshed	%IWr.m.c.2.0 to %IWr.m.c.2.15
REFRESH_IO_32 to REFRESH_IO_47	BOOL	R	Indicates that the Inputs/Outputs of the IO Scanning Utility from station 32 to 47 are refreshed	%IWr.m.c.3.0 to %IWr.m.c.3.15
REFRESH_IO_48 to REFRESH_IO_63	BOOL	R	Indicates that the Inputs/Outputs of the IO Scanning Utility from station 48 to 63 are refreshed	%IWr.m.c.4.0 to %IWr.m.c.4.15
VALID_GD_0 to VALID_GD_15	BOOL	R	Indicates that the Global Data from the station 0 to 15 are refreshed	%IWr.m.c.6.0 to %IWr.m.c.6.15
VALID_GD_16 to VALID_GD_31	BOOL	R	Indicates that the Global Data from the station 16 to 31 are refreshed	%IWr.m.c.7.0 to %IWr.m.c.7.15
VALID_GD_32 to VALID_GD_47	BOOL	R	Indicates that the Global Data from the station 32 to 47 are refreshed	%IWr.m.c.8.0 to %IWr.m.c.8.15
VALID_GD_48 to VALID_GD_63	BOOL	R	Indicates that the Global Data from the station 48 to 63 are refreshed	%IWr.m.c.9.0 to %IWr.m.c.9.15

Details of Explicit Exchange Objects of the IODDT of Type T_COM_ETYX103

At a Glance

This part describes the explicit exchange objects of the IODDT of type T_COM_ETYX103 which applies to the modules TSX ETY 4103/PORT/5103. It includes word-type objects whose bits have a special meaning. These objects are described in detail below.
Example of declaring a variable: IODDT_VAR1 of type T_COM_ETYX103

Remarks

- Generally speaking, the meaning of bits is given for state 1 of this bit. In specific case, each state of the bit is explained.
- Not all bits are used.

Explicit Exchange Indicators: EXCH_STS

The table below gives the meanings of the exchange control bits of the channel EXCH_STS (%MWr.m.c.0).

Standard symbol	Type	Access	Meaning	Address
STS_IN_PROGR	BOOL	R	Reading of status words of the channel in progress.	%MWr.m.c.0.X0
CMD_IN_PROGR	BOOL	R	Exchange of parameters of command in progress	%MWr.m.c.0.X1
ADJ_IN_PROGR	BOOL	R	Exchange of parameters of adjustment in progress	%MWr.m.c.0.X2

Explicit Exchange Report: EXCH_RPT

The table below gives the meanings of the report bits EXCH_RPT (%MWr.m.c.1).

Standard symbol	Type	Access	Meaning	Address
STS_ERR	BOOL	R	Error in reading status words of the channel	%MWr.m.c.1.X0
CMD_ERR	BOOL	R	Error when exchanging command parameters	%MWr.m.c.1.X1
ADJ_ERR	BOOL	R	Error when exchanging adjustment parameters	%MWr.m.c.1.X2

Standard Channel Faults, CH_FLT

The table below gives the meanings of the status word bits CH_FLT (%MWr.m.c.2). The reading is taken by a READ_STS (IODDT_VAR1).

Standard symbol	Type	Access	Meaning	Address
INTERNAL_FLT	BOOL	R	Internal or channel self-test fault	%MWr.m.c.2.4
APPLI_FLT	BOOL	R	Application fault (adjustment or configuration fault)	%MWr.m.c.2.7

Network Diagnostics

The table below shows the status words (or double words) CH_FLT (%MWr.m.c.3 to 6, %MWr.m.c.11 to 15 and %MDr.m.c.7 and 9) used for diagnosing the network. The reading is taken by a READ_STS (IODDT_VAR1).

Standard symbol	Type	Access	Meaning	Address
NB_P502_CNX	INT	R	Number of Port 502 connections and bridge configuration information	%MWr.m.c.3
NB_DENIED_CNX	INT	R	Number of denied Port 502 connections)	%MWr.m.c.4
NB_P502_REF	INT	R	Number of refused messages on Port 502	%MWr.m.c.5
XWAY_ADDR	INT	R	X-Way address (Network, station)	%MWr.m.c.6
NB_SENT_MSG	DINT	R	Number of sent messages on Port 502	%MDr.m.c.7
NB_RCV_MSG	DINT	R	Number of received messages on Port 502	%MDr.m.c.9
NB_IOS_MSG	INT	R	Number of IOScanner messages received	%MWr.m.c.11
NB_IOS_CNX	INT	R	Number of error-free modules scanned	%MWr.m.c.12
GLBD_ERROR	INT	R	Global Data coherence error	%MWr.m.c.13
BW_GLBD_IOS	INT	R	Global Data and IOScanner utilities loading	%MWr.m.c.14
BW_OTHER_MSG	INT	R	Loading of messaging utility and other utilities	%MWr.m.c.15

Details of Explicit Exchange Objects of the IODDT of Type T_COM_WMY_100

Introduction

This part introduces explicit exchange objects of the T_COM_WMY_100 IODDT which apply to the TSX WMY 100 module (there are no implicit exchange objects in this IODDT). It groups word-type objects whose bits have a particular meaning. These objects are described in detail below.
Example of declaring a variable: IODDT_VAR1 of type T_COM_WMY_100

Notes

- The meaning of a bit is generally given for the status of the bit when set to 1. In specific cases an explanation is given for each status of the bit.
- Not all bits are used.

Execution Flags of an Explicit Exchange: EXCH_STS

The table below presents the exchange control bits of the channel EXCH_STS (%MWr.m.c.0).

Standard symbol	Type	Access	Meaning	Number
STS_IN_PROGR	BOOL	R	Reading of status words of the channel in progress.	%MWr.m.c.0.X0
CMD_IN_PROGR	BOOL	R	Exchange of parameters of command in progress	%MWr.m.c.0.X1
ADJ_IN_PROGR	BOOL	R	Exchange of parameters of adjustment in progress	%MWr.m.c.0.X2

Explicit Exchange Report: EXCH_RPT

The table below presents the meaning of the exchange report bits EXCH_RPT (%MWr.m.c.1).

Standard symbol	Type	Access	Meaning	Number
STS_ERR	BOOL	R	Error in reading status words of the channel	%MWr.m.c.1.X0
CMD_ERR	BOOL	R	Error when exchanging command parameters	%MWr.m.c.1.X1
ADJ_ERR	BOOL	R	Error when exchanging adjustment parameters	%MWr.m.c.1.X2

Standard Channel Faults, CH_FLT

The table below presents the meaning of the status word CH_FLT (%MWr.m.c.2). Reading is carried out by a READ_STS(IODDT_VAR1).

Standard symbol	Type	Access	Meaning	Number
INTERNAL_FLT	BOOL	R	Internal or channel self-test fault	%MWr.m.c.2.4
APPLI_FLT	BOOL	R	Application fault (adjustment or configuration fault)	%MWr.m.c.2.7

Network Diagnostics

The table below shows the status words (or double words) CH_FLT (%MWr.m.c.3 to 6, %MWr.m.c.11 to 15 and %MDr.m.c.7 and 9) used for diagnosing the network. Reading is carried out by a READ_STS(IODDT_VAR1).

Standard symbol	Type	Access	Meaning	Number
NB_P502_CNX	INT	R	Number of Port 502 connections and bridge configuration information	%MWr.m.c.3
NB_DENIED_CNX	INT	R	Number of denied Port 502 connections)	%MWr.m.c.4
NB_P502_REF	INT	R	Number of refused messages on Port 502	%MWr.m.c.5
XWAY_ADDR	INT	R	X-Way address (Network, station)	%MWr.m.c.6
NB_SENT_MSG	DINT	R	Number of sent messages on Port 502	%MDr.m.c.7
NB_RCV_MSG	DINT	R	Number of received messages on Port 502	%MDr.m.c.9
BW_OTHER_MSG	INT	R	Loading of messaging utility and other utilities	%MWr.m.c.15

Details of Implicit Exchange Objects of the IODDT of Type T_COM_ETHCOPRO

Introduction

This part shows the implicit exchange objects of the IODDT of type T_COM_ETHCOPRO which applies to the Ethernet channel of the TSX P57 5634 (channel 3). It concerns those word type objects whose bits have a particular meaning. These objects are described in detail below.

Example of declaring a variable: IODDT_VAR1 of type T_COM_ETHCOPRO

List of Implicit Exchange Objects

The table below shows the implicit exchange objects of the IODDT of type T_COM_ETHCOPRO which applies to the Ethernet channel of the TSX P57 5634.

Standard symbol	Type	Access	Meaning	Number
CH_ERROR	EBOOL	R	Line error bit.	%Ir.m.3.ERR
REFRESH_IO_0 to REFRESH_IO_15	BOOL	R	Indicates that the Inputs/ Outputs of the IO Scanning Utility from station 0 to 15 are refreshed	%IWr.m.3.1.0 to %IWr.m.3.1.15
REFRESH_IO_16 to REFRESH_IO_31	BOOL	R	Indicates that the Inputs/ Outputs of the IO Scanning Utility from station 16 to 31 are refreshed	%IWr.m.3.2.0 to %IWr.m.3.2.15
REFRESH_IO_32 to REFRESH_IO_47	BOOL	R	Indicates that the Inputs/ Outputs of the IO Scanning Utility from station 32 to 47 are refreshed	%IWr.m.3.3.0 to %IWr.m.3.3.15
REFRESH_IO_48 to REFRESH_IO_63	BOOL	R	Indicates that the Inputs/ Outputs of the IO Scanning Utility from station 48 to 63 are refreshed	%IWr.m.3.4.0 to %IWr.m.3.4.15
REFRESH_IO_64 to REFRESH_IO_79	BOOL	R	Indicates that the Inputs/ Outputs of the IO Scanning Utility from station 64 to 79 are refreshed	%IWr.m.3.5.0 to %IWr.m.3.5.15
REFRESH_IO_80 to REFRESH_IO_95	BOOL	R	Indicates that the Inputs/ Outputs of the IO Scanning Utility from station 80 to 95 are refreshed	%IWr.m.3.6.0 to %IWr.m.3.6.15

Standard symbol	Type	Access	Meaning	Number
REFRESH_IO_96 to REFRESH_IO_111	BOOL	R	Indicates that the Inputs/ Outputs of the IO Scanning Utility from station 96 to 111 are refreshed	%IWr.m.3.7.0 to %IWr.m.3.7.15
REFRESH_IO_112 to REFRESH_IO_127	BOOL	R	Indicates that the Inputs/ Outputs of the IO Scanning Utility from station 112 to 127 are refreshed	%IWr.m.3.8.0 to %IWr.m.3.8.15
VALID_GD_0 to VALID_GD_15	BOOL	R	Indicates that the Global Data from the station 0 to 15 are refreshed	%IWr.m.3.9.0 to %IWr.m.3.9.15
VALID_GD_16 to VALID_GD_31	BOOL	R	Indicates that the Global Data from the station 16 to 31 are refreshed	%IWr.m.3.10.0 to %IWr.m.3.10.15
VALID_GD_32 to VALID_GD_47	BOOL	R	Indicates that the Global Data from the station 32 to 47 are refreshed	%IWr.m.3.11.0 to %IWr.m.3.11.15
VALID_GD_48 to VALID_GD_63	BOOL	R	Indicates that the Global Data from the station 48 to 63 are refreshed	%IWr.m.3.12.0 to %IWr.m.3.12.15

Details of Explicit Exchange Objects of the IODDT of Type T_COM_ETHCOPRO

At a Glance

This part shows the explicit exchange objects of the IODDT of type T_COM_ETHCOPRO which applies to the Ethernet channel of the TSX P57 5634. It includes word-type objects whose bits have a special meaning. These objects are described in detail below.

Example of declaring a variable: IODDT_VAR1 of type T_COM_ETHCOPRO

Remarks

- Generally speaking, the meaning of bits is given for state 1 of this bit. In specific case, each state of the bit is explained.
- Not all bits are used.

Explicit Exchange Indicators: EXCH_STS

The table below gives the meanings of the exchange control bits of the channel EXCH_STS (%MWr.m.c.0).

Standard symbol	Type	Access	Meaning	Address
STS_IN_PROGR	BOOL	R	Reading of status words of the channel in progress.	%MWr.m.c.0.X0

Standard Channel Faults, CH_FLT

The table below gives the meanings of the status word bits CH_FLT (%MWr.m.c.2). The reading is taken by a READ_STS (IODDT_VAR1).

Standard symbol	Type	Access	Meaning	Address
INTERNAL_FLT	BOOL	R	Internal or channel self-test fault	%MWr.m.c.2.4
APPLI_FLT	BOOL	R	Application fault (adjustment or configuration fault)	%MWr.m.c.2.7

Network Diagnostics

The table below shows the status words (or double words) CH_FLT (%MWr.m.c.3 to 6, %MWr.m.c.11 to 15 and %MDr.m.c.7 and 9) used for diagnosing the network. The reading is taken by a READ_STS (IODDT_VAR1).

Standard symbol	Type	Access	Meaning	Address
NB_P502_CNX	INT	R	Number of connections on the Port 502 and bridge configuration information	%MWr.m.c.3
NB_DENIED_CNX	INT	R	Number of denied Port 502 connections)	%MWr.m.c.4
NB_P502_REF	INT	R	Number of refused messages on Port 502	%MWr.m.c.5
XWAY_ADDR	INT	R	X-Way address (Network, station)	%MWr.m.c.6
NB_SENT_MSG	DINT	R	Number of sent messages on Port 502	%MDr.m.c.7
NB_RCV_MSG	DINT	R	Number of received messages on Port 502	%MDr.m.c.9
NB_IOS_MSG	INT	R	Number of IOScanner messages received	%MWr.m.c.11
NB_IOS_CNX	INT	R	Number of error-free modules scanned	%MWr.m.c.12
GLBD_ERROR	INT	R	Global Data coherence error	%MWr.m.c.13
BW_GLBD_IOS	INT	R	Global Data and IOScanner utilities loading	%MWr.m.c.14
BW_OTHER_MSG	INT	R	Loading of messaging utility and other utilities	%MWr.m.c.15
IP_ADDR	DINT	R	IP Address	%MDr.m.c.16
IP_NETMASK	DINT	R	IP subnetwork mask	%MDr.m.c.18
IP_GATEWAY	DINT	R	Default gateway	%MDr.m.c.20
MAC_ADDR1	INT	R	MAC address 1	%MWr.m.c.22
MAC_ADDR2	INT	R	MAC address 2	%MWr.m.c.23
MAC_ADDR3	INT	R	MAC address 3	%MWr.m.c.24
FW_VERSION	INT	R	Embedded software version	%MWr.m.c.25
BOARD_STS	INT	R	Board status	%MWr.m.c.26
NET_TIME	DINT	R	Network time	%MDr.m.c.27

10.4 The IODDT Type T_GEN_MOD Applicable to all Modules

Details of the Language Objects of the IODDT of Type T_GEN_MOD

At a Glance

All the modules of Premium PLCs have an associated IODDT of type T_GEN_MOD.

Notes

- The meaning of a bit is generally given for the status of the bit when set to 1. In specific cases an explanation is given for each status of the bit.
- Not all bits are used.

List of Objects

The table below shows the objects of the IODDT

Standard symbol	Type	Access	Meaning	Number
MOD_ERROR	BOOL	R	Module error bit	%Ir.m.MOD.ERR
EXCH_STS	INT	R	Module exchange control word.	%MWr.m.MOD.0
STS_IN_PROGR	BOOL	R	Reading of status words of the module in progress.	%MWr.m.MOD.0.0
EXCH_RPT	INT	R	Exchange report word.	%MWr.m.MOD.1
STS_ERR	BOOL	R	Fault when reading module status words.	%MWr.m.MOD.1.0
MOD_FLT	INT	R	Internal error word of the module.	%MWr.m.MOD.2
MOD_FAIL	BOOL	R	Internal error, module failure.	%MWr.m.MOD.2.0
CH_FLT	BOOL	R	Faulty channel(s).	%MWr.m.MOD.2.1
BLK	BOOL	R	Terminal block fault.	%MWr.m.MOD.2.2
CONF_FLT	BOOL	R	Hardware or software configuration fault.	%MWr.m.MOD.2.5
NO_MOD	BOOL	R	Module missing or off.	%MWr.m.MOD.2.6

10.5 Ethernet Configuration Language Objects

At a Glance

This section describes the configuration language objects associated with the Ethernet communication modules on Premium and Atrium PLCs.

What's in this Section?

This section contains the following topics:

Topic	Page
Language Objects Associated with the Configuration of a TSX ETY 110	309
Language Objects Associated with Configuration	311

Language Objects Associated with the Configuration of a TSX ETY 110

At a Glance

This page describes the language objects for the configuration of a TSX ETY 110 module. These objects can be read by the application program.

Internal Constants

The following table describes the language objects for the configuration of a TSX ETY 110 module.

Object	Function	Meaning
%KWr.m.0.0	Type	Byte 0 = 11 for ETHWAY communication Byte 1: reserved
%KWr.m.0.1	Physical layer	Byte 0: reserved Byte 1: reserved
%KWr.m.0.2	Utilities supported	Byte 0: common data ● x0 = 1: activation of ETHWAY common words ● x1 = 0: reserved ● x2 = 1: common words read only ● x3 = 1: common words read/write ● x4 to x7 = 0: reserved Byte 1: reserved
%KWr.m.0.4	Common words	Byte 0: number of common words Byte 1: reserved
%KWr.m.0.5	X-Way network address	Byte 0: network number (0 by default) Byte 1: reserved
%KWr.m.0.6	Type of Ethernet driver for TCP/IP	Byte 0: ● = 16#00 : AUI (default value) ● = 16#01 : RJ45 Byte 1: ● = 16#00 : Ethernet II (default value) ● = 16#01 : 802.3
%KWr.m.0.7	TCP/IP configuration: address type	Byte 0: reserved Byte 1: inherited address ● = 16#00 : default address ● = 16#01 : from the application-specific function ● = 16#03 : from a server
%KWr.m.0.8 and %KWr.m.0.9	Local IP address	Example with the address 139.160.650.109 Byte 109 = 0 (least significant) Byte 1 = 65 Byte 2 = 160 Byte 3 = 139 (most significant)
%KWr.m.0.10 and %KWr.m.0.11	IP address of gateway	Example with the address 139.160.65.1 Byte 0 = 1 Byte 1 = 65 Byte 2 = 160 Byte 3 = 139
%KWr.m.0.12 and %KWr.m.0.13	Subnetwork mask	Example with the address 255.255.255.0 Byte 0 = 0 Byte 1 = 255 Byte 2 = 255 Byte 3 = 255

Language Objects Associated with Configuration

Introduction

This page describes all the configuration language objects for Ethernet communication with the TSX ETY 4103/PORT/5103 module and the Ethernet channel of the TSX P57 5634, which can be displayed by the application program.

Internal Constants

The following table describes the internal constants:

Object	Function	Meaning
%KWr.m.c.0	Type	Byte 0 = 11 for Ethernet communication Byte 1: reserved
%KWr.m.c.1	Physical layer	Byte 0: fixed at 16#01 (corresponds to GPX2) Byte 1: reserved
%KWr.m.c.2	Reserved	-
%KWr.m.c.3	Reserved	-
%KWr.m.c.4	Reserved	-
%KWr.m.c.5	X-Way network address	Byte 0: network number (0 by default) Byte 1: reserved
%KWr.m.c.6	Type of Ethernet driver for TCP/IP	Byte 0: fixed at 16#01 (corresponds to RJ45) ● = 16#01 : RJ45 Byte 1: ● = 16#00 : Ethernet II (default value) ● = 16#01 : 802.3
%KWr.m.c.7	TCP/IP configuration: address type	Byte 0: reserved Byte 1: inherited address ● = 16#01 : from the application-specific function ● = 16#03 : from a server
%KWr.m.c.8 and %KWr.m.c.9	Local IP address	Example with the address 139.160.650.109 Byte 0 = 109 Byte 1 = 65 Byte 2 = 160 Byte 3 = 139
%KWr.m.c.10 and %KWr.m.c.11	IP address of gateway	Example with the address 139.160.65.1 Byte 0 = 1 Byte 1 = 65 Byte 2 = 160 Byte 3 = 139
%KWr.m.c.12 and %KWr.m.c.13	Subnetwork mask	Example with the address 255.255.255.0 Byte 0 = 0 (least significant) Byte 1 = 255 Byte 2 = 255 Byte 3 = 255 (most significant)
%KWr.m.c.14	Utilities used	Byte 0: ● bit 0 =1: the IOScanner utility is used ● bit 1 =1: BOOTP server utility is used ● bit 2 =1: the Global Data utility is used ● bit 3 =1: the utility to adjust bandwidth is used Byte 1: reserved
%KWr.m.c.15	TCP utilities used	Byte 0: ● bit 0 =1: Modbus communication on TCP/IP is used ● bit 1 =1: access control is activated Byte 1: reserved

Questions/Answers

11

Questions/Answers

General

Below you will find a list of the most frequently asked questions and answers regarding communication by Ethernet network.

Can a Momentum be searched by several ENT at a time?
Yes, in read only. Only one IO Scanner at a time should access the ENT in write mode,

Do I have to configure the IO Scanner connections in the connections table ("Messaging" tab)?
No.

What should I do if the TSX ETY 4103/PORT5103 module displays the LED status "Not configured" (Flashing ERR)?
- Check that it is configured in Unity Pro.
- Check that there is no other module with the same X-Way network number in the PLC configuration.
- If the module is configured in "Servie address", make sure that a BOOTP server is operational and accessible.

What should I do if the module displays a correct LED status (STS=RUN=ON) but does not respond to requests?
Try a Ping command to this IP address, from a device on the same network:
- No response:
  - Check the network configuration: wiring, "hubs" status, IP addresses, masks and gateways if there are routers in the configuration.
- Correct response to the Ping:
  - Check the module's X_WAY address.
  - Check whether access control is activated or not.
  - Try to connect to the Rack Viewer page by http. If this connection works, check the X-Way address of the client application.

Can I change the MAC address of the module?
No. This is fixed for every Ethernet device to guarantee its unicity.

How can I find out the speed with which the module communicates?
Via an internet browser, by connecting to the Ethernet Module Statistics page.

What should I do if the messaging EFs do not get a response?
- Check that the X-Way destination address is part of the IP/X-Way connections table.
- Check that the configuration of the destination module does not prohibit this connection (access control).
- In debug mode, try the "Ping" command towards the IP address of the destination PLC, then try an "Identification" request towards the destination address, if it is part of the same X-Way network.

What should I do if I receive the 0xFF12 refusal code on the messaging EFs?
This code indicates that the module is full. Reduce the transition rate.

What should I do if the READ_ASYNC, WRITE_ASYN messaging EFs do not get a response (time out)?
Check that the "mast" tasks of the client and server PLCs are configured to "periodic", with a sufficient period to ensure that the PLCs are not overrun.

When should I configure my connections to "Mono-Connection"?
When this connection has to be established to a TSX ETY 110, Modbus protocol.

The destination PLC of my messages is a bridge. Which X-Way destination address should I configure in the connections table?
The X-Way address of the first communication module of the PLC bridge (if present, it is the processor PCMCIA card).

I have changed the IP addresses in Address Server and IO Scanner configuration, should I restart my client/server devices?
Yes. The devices only receive their IP address when starting up. This restart should be carried out once the TSX ETY 4103/5103 module has been reconfigured (fixed RUN and STS LEDs).

In the module configuration screens, the last entry inserted into one of the grids has not been taken into account at the validation. Why?
You need to remove the focus (the scale indicator) from the last cell of the grid in which new data has been entered in order to take this modification into account.

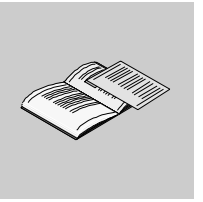
Why is the Bridge tab grayed out when I use a processor of type ??????????
These processors do not manage bridge data.

Why is the Bridge tab grayed out when I have already changed the position of the processor?
After this type of modification, you have to validate the new hardware configuration to access and modify the bridge data managed globally at the level of the processor.

The momentum 170 ENT modules do not manage to obtain their client/server address from the address server of the TSX ETY 4103, TSX ETY PORT or TSX ETY 5103 modules.
- Check in the TSX ETY 4103 or TSX ETY PORT module configuration that the subnetwork mask agrees with the IP address class.
- Check the software version of the 170 ENT module.

The Global Data utility does not work. Why?
Make sure that the network switches are not configured in "multicast filtering".

Appendices



At a Glance

Overview

The following appendixes contain material that was missing from the manual that was originally released with Unity 2.0. They describe Ethernet services supported by the Premium devices. An errata sheet is also provided. This material will be incorporated into the next release of this user manual.

What's in this Appendix?

The appendix contains the following chapters:

Chapter	Chapter Name	Page
A	I/O Scanner	319
B	Time Synchronization Service	327
C	Electronic Mail Notification Service	333
D	Errata Sheet	339

I/O Scanner

A

At a Glance

Introduction

This chapter discusses the Ethernet modulesí I/O scanner capabilities.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
I/O Scanner Concepts	320
Modicon Premium with Unity I/O Scanner Configuration	323

I/O Scanner Concepts

Introduction

An I/O scanner resides in the TSX P57 ETY 4103 and -5103 Ethernet modules and in the TSX P57 x634 CPUs. It transfers data between network devices and allows a CPU to regularly read data from and write data to scanned devices. The I/O scanner needs to be configured with Unity Pro.

I/O Scan List

An I/O scan list is a configuration table that identifies the targets with which repetitive communication is authorized. While the CPU is running, the Ethernet module transfers data to and from the CPUís registers as dictated by the I/O scan list.

Health Block Bits

Each health block bit corresponds to an entry in the I/O scanner table. Each entry in the table represents one logical device. The bits contain the health status for the Premium I/O scanner.
The bits in the health block correspond to the different data types as follows:

Bit	**Data Type**	
	%I	**%IW**
1	%I1	%IW1.0
16	%I16	%IW1.15
17	%I17	%IW2.0

I/O Scanner Parameters

Parameter	Value
Max. Number of Devices	64: TSX P57 ETY 4103 or -5103
	64: TSX P57 1634, i2634 or -3634 ETY port CPU
	128: TSX P57 4634 or -5634 high end CPU
Max. Number of Input Words	4096 for high end CPUs
	2000 for ETY modules and ETY port CPUs
Max. Number of Output Words	4096 for high end CPUs
	2000 for ETY modules and ETY port CPUs
Health Timeout Value	User configurable (between 1 ms ... 2 s, in 1 ms increments)
Last Value (Input)	User configurable (go to 0 or hold last value)
IP Address	User configurable IP address of scanned device (Slave IP)
Local and Remote Register Reference	User configurable
Repetition Rate	User configurable
Unit ID	User configurableó only when you are using a bridge
Operation through a bridge	Modbus bridge supported
	Modbus Plus bridge supported

Use the I/O Scanner configuration dialog (see ***p. 323***) in Unity Pro to set the scannerís operating parameters.

Using the I/O Scanner across a Network Router

Note: The I/O scanner can scan devices through an IP router with a TTL of 10.

Device Control Block

The device control block is a block of registers that supports either 8 words or 4 double words. The content of the registers is mapped in the CPUís memory. Each bit corresponds to an entry in the table.

Each I/O scanner device can be disabled. To disable an individual scanner device:

Step	Action
1	Select the Device Control Block option in the I/O Scanner configuration dialog (see ***lp. 323***).
2	Put a check mark in the box.
3	Set the associated bit to 1, e.g., %MD2:4

Note: IA value of 0 in the device control block bit enables the device. A value of 1 in the device control block bit disables the device.

The following table shows how the device control block bits are mapped to I/O scanner entries:

Word																	
1	Table Entry #	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
	Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2	Table Entry #	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17
	Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
		Word 3 through Word 7															
8	Table Entry #	128	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113
	Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Modicon Premium with Unity I/O Scanner Configuration

Introduction

Use the I/O scanner to transfer data between master devices and slave devices.

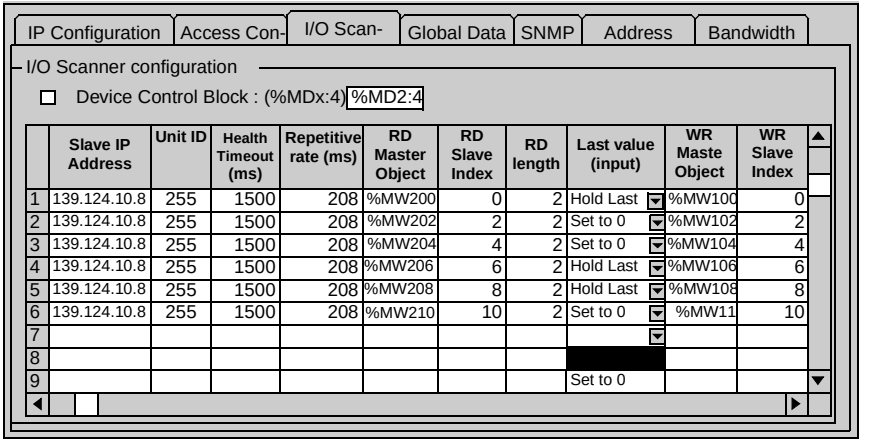
Note: The I/O scanner does not work if you enable the device control block with outdated versions of the firmware or software.

If you enable the device control block, you must have Unity Pro V2.0 or higher and:

If you are using ...	they must be at ...
TSX P57 ETY 4103 or -5103 Ethernet communications modules	version 3.1 or higher
TSX P57 1634, -2634 or -3634 ETY ports	version 3.1 or higher
TSX P57 4634 or -5634 high end CPUs	version 2.0 or higher

I/O Scanner Configuration Dialog

Click the I/O Scanner tab on the Network Configuration screen to display the I/O Scanner configuration dialog. Below is a sample view of an I/O Scanner dialog for a high end CPU:

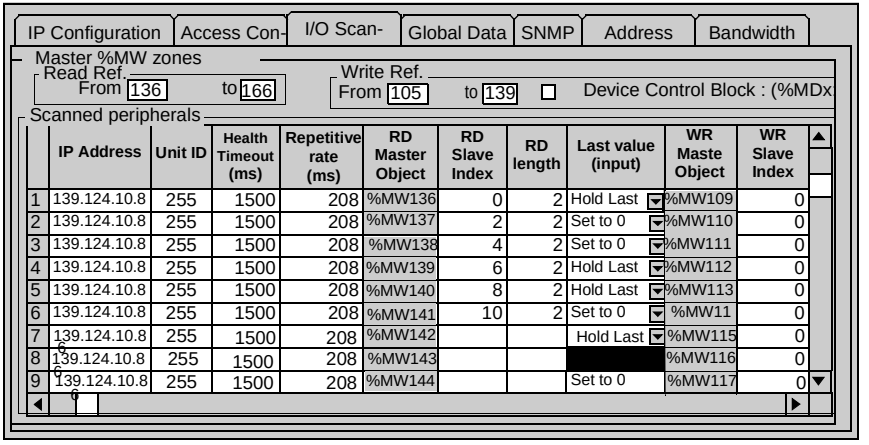


	Slave IP Address	Unit ID	Health Timeout (ms)	Repetitive rate (ms)	RD Master Object	RD Slave Index	RD length	Last value (input)	WR Maste Object	WR Slave Index
1	139.124.10.8	255	1500	208	%MW200	0	2	Hold Last	%MW100	0
2	139.124.10.8	255	1500	208	%MW202	2	2	Set to 0	%MW102	2
3	139.124.10.8	255	1500	208	%MW204	4	2	Set to 0	%MW104	4
4	139.124.10.8	255	1500	208	%MW206	6	2	Hold Last	%MW106	6
5	139.124.10.8	255	1500	208	%MW208	8	2	Hold Last	%MW108	8
6	139.124.10.8	255	1500	208	%MW210	10	2	Set to 0	%MW11	10
7										
8										
9								Set to 0		

Set the desired configuration parameters in the I/O Scanner configuration dialog by entering data in appropriate fields.

Parameter	Field	Description
Device Control Block	check box	If this box is checked, the device control block is enabled and the master can send requests to a slave. If the box is not checked, the device control block functionality is disabled and all I/O scanner table entries are active at all times.
	%MDx:4	If a Device Control Block bit is disabled, the I/O scanner closes the connection and sets the health bit to an unhealthy state (bit value = 1).
Entry #	leftmost column in the dialog	valid range: 1 ... 128 Each entry represents a logical device on the network.
Slave IP Address	second column in the dialog	IP address of each scanned Ethernet device
Unit ID	third column in the dialog	Specific ID of each device on the Modbus/Modbus Plus network The device connects to the Ethernet through a bridge.
Health Timeout (ms)	fourth column in the dialog	Timeout period for each device, specified in milliseconds
Repetitive rate (ms)	fifth column in the dialog	Rate at which each deviceís data is scanned
RD Master Object	sixth column in the dialog	Destination address in the CPU for data read from each device
RD Slave Index	seventh column in the dialog	Source address of the I/O module for the read period
RD length	eighth column in the dialog	Number of words to read
Last value (Input)	ninth column in the dialog	Status of the inputs in the event of an error
WR Master Object	tenth column in the dialog	Source address in the CPU for write operations with each device Write operations are always performed at the word level.
WR Slave Object	eleventh column in the dialog	Write destination address for each slave
WR length	twelfth column in the dialog	Number of words to be written
Description	rightmost column in the dialog	Additional information

Below is a sample view of an I/O Scanner dialog for an ETY module:



	IP Address	Unit ID	Health Timeout (ms)	Repetitive rate (ms)	RD Master Object	RD Slave Index	RD length	Last value (input)	WR Maste Object	WR Slave Index
1	139.124.10.8	255	1500	208	%MW136	0	2	Hold Last	%MW109	0
2	139.124.10.8	255	1500	208	%MW137	2	2	Set to 0	%MW110	0
3	139.124.10.8	255	1500	208	%MW138	4	2	Set to 0	%MW111	0
4	139.124.10.8	255	1500	208	%MW139	6	2	Hold Last	%MW112	0
5	139.124.10.8	255	1500	208	%MW140	8	2	Hold Last	%MW113	0
6	139.124.10.8	255	1500	208	%MW141	10	2	Set to 0	%MW11	0
7	139.124.10.8	255	1500	208	%MW142			Hold Last	%MW115	0
8	139.124.10.8	255	1500	208	%MW143				%MW116	0
9	139.124.10.8	255	1500	208	%MW144			Set to 0	%MW117	0

The configuration parameters in this dialog are as follows;

Parameter	Field	Description
Read Ref.	A pair of data boxesó ***From*** and ***to***	The values in these boxes define the range of destination address values in the CPU for the data read from each device. The addresses you enter here are displayed in the RD Master Object column (the sixth column) of the dialog. In the example above, the Read Ref. values range from 136 to 166; notice that these values are displayed as %MW136, %MW137, ... in the Master Object column.
Write Ref.	A pair of data boxesó ***From*** and ***to***	The values in these boxes define the range of source address values in the CPU for the Device Control Block parameters and for write-operations data. The first four addresses you enter here (registers %MW105, %MW106, %MW107 and %MW108 in the example above) are used for Device Control Block parameters. The remaining registers are displayed in the WR Master Object column (the tenth column) of the dialog. In the example above, values starting at %MW109 are shown in the WR Master Object column.
Device Control Block	check box	If this box is checked, the device control block is enabled and the master can send requests to a slave. If the box is not checked, the device control block functionality is disabled and all I/O scanner table entries are active at all times.
	%MDx:4	If a Device Control Block bit is disabled, the I/O scanner closes the connection and sets the health bit to an unhealthy state (bit value = 1).

Parameter	Field	Description
Entry #	leftmost column in the dialog	valid range: 1 ... 128 Each entry represents a logical device on the network.
IP Address	second column in the dialog	IP address of each scanned Ethernet device
Unit ID	third column in the dialog	Specific ID of each device on the Modbus/Modbus Plus network The device connects to the Ethernet through a bridge.
Health Timeout (ms)	fourth column in the dialog	Timeout period for each device, specified in milliseconds
Repetitive rate (ms)	fifth column in the dialog	Rate at which each deviceís data is scanned
RD Master Object	sixth column in the dialog	A read-only display of the read-data destination addresses that you chose in the Read Ref. boxes above.
RD Slave Index	seventh column in the dialog	Source address of the I/O module for the read period
RD length	eighth column in the dialog	Number of words to read
Last value (Input)	ninth column in the dialog	Status of the inputs in the event of an error
WR Master Object	tenth column in the dialog	A read-only display of the write-operation source addresses that you chose in the Write Ref. boxes above. Write operations are always performed at the word level.
WR Slave Object	eleventh column in the dialog	Write destination address for each slave
WR length	twelfth column in the dialog	Number of words to be written
Description	rightmost column in the dialog	Additional information

Time Synchronization Service

B

At a Glance

Introduction

The time synchronization service establishes an accurate local clock by referencing a network time protocol (NTP) server.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
The Time Synchronization Service	328
Using the Time Synchronization Service	331
Using the R_NTPC Block for Time Synchronization	332

The Time Synchronization Service

Introduction

The time synchronization service established accuracy among computer clocks on an Ethernet system. For example, the time of one client may be synchronized either with another server or to a referenced time source such as a radio or satellite receiver.

Typical time service configurations use redundant servers and diverse network paths to establish high accuracy and reliability. Time service accuracy can be within a millisecond on LANs and within tens of milliseconds on WANs.

Use the time synchronization service for:

- event recordingó e.g., tracking a sequence of events
- event synchronizationó e.g., triggering simultaneous events
- alarm and I/O synchronizationó e.g., time stamping alarms

Features of the Service

The time synchronization service offers:

- periodic time corrections obtained from the reference standardó e.g., the NTP server
- automatic switchover to a backup time server if a problem occurs with the normal server system
- local time zone configurable and customizable (including daylight savings time adjustments)
- web page diagnostics for the time synchronization service

Controller projects use a function block to read the clock, a feature that allows events or variables in the project to be time stamped. Time stamping is accurate to:

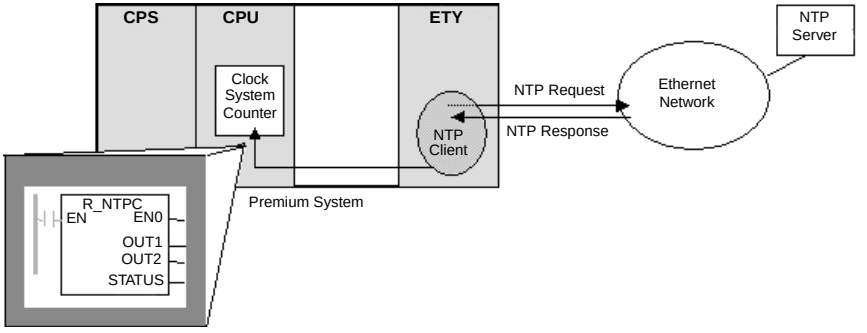
- 5 ms for the TSX P57 4634 and -5634 high end CPUs
- 10 ms for other CPUs

Time Synchronization and Time Stamps

The ETY Ethernet communications modules send a source time-synchronization signal to a CPU. The ETYís firmware includes an NTP client, which provides time synchronization. The synchronization process occurs as follows:

The NTP Client ...		Result
1	... requests a time synchronization signal from the NTP server over an Ethernet network.	The NTP server sends a signal.
2	... stores the time.	
3	... sends a message to the clock system counter in the CPU.	The CPU updates its internal clock at 1 ms for high end CPUs or 5 ms for other CPUs.

Use the R_NTPC function block (see ***p. 332***) in either MAST, FAST or Interrupt sections to read the clock from the PLC application,
All the CPUs on an Ethernet network should be synchronized with the same NTP server.



Time Synchronization Terms

Term	Description of Service
local clock offset	Accurate local time adjustments are made via a local clock offset. The local clock offset is calculated as: `((T4 - T1) + (T3 - T2))2` where ● T1 = time when NTP request is transmitted from the module ● T2 = time when NTP server receives the request (provided by the module in response) ● T3 = time when the NTP server transmits the response (provided to the module in the response) ● T4 = time when NTP response is received by the module
time accuracy	The local time error is < 10 ms compared to the referenced NTP serverís time. ● typical: under 5 ms ● worst case: <10 ms
settling time	Maximum accuracy is obtained after 2 updates from the NTP server.
polling period dependency	Accuracy depends on the polling period. Less than 10 ms of error is guaranteed for polling periods of 120 s or less. To obtain the best possible accuracy (when your network bandwidth allows), reduce the polling period to a small valueó e.g., a polling time of 5 s provides better accuracy than a time of 30 s.
time zone	The default format is universal time, coordinated (UTC). Optionally you may configure the service to use a local time zoneó e.g., GMT+1 for Barcelona or Paris
daylight savings time	The module automatically adjusts the time change in the spring and fall.
leap second	To compensate for the deceleration of the earthís rotation, the module automatically inserts a leap second in the UTC time every 18 months via an international earth rotation service (IERS). Leap seconds are inserted automatically as needed. When needed, they are inserted at the end of the last minute in June or December, as commanded by the NTP server.

Using the Time Synchronization Service

Establishing Accuracy at Power Up

Before starting a system, the Ethernet network must be configured for a predefined interval within which the accuracy is established. Accuracy is established at power-upó the Ethernet module boots and then obtains the time from the NTP server (see ***p. 229***).
Several updates may be required to achieve peak accuracy. Once an accurate time is obtained, the time synchronization service sets the STATUS (see ***p. 332***) in the associated time service register.

Obtaining and Maintaining Accuracy

The time service clock starts at 0 and increments until the Ethernet network time is fully updated from the module.

Model	Starting Date
Premium with Unity	January 1st 1980 00:00:00.00

- Clock accuracy is not affected by issuing Stop/Run commands on the PLC
- Clock updates are not affected by issuing Stop/Run commands on the PLC
- Mode transitions do not affect the accuracy of the Ethernet network

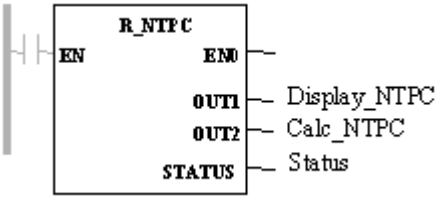
Reinitializing the Time Service Register

After a download or an NTP server swap, the status clock value associated with the time service register in the CPU is reinitialized.
Two polling periods elapse before an accurate time is re-established.

Using the R_NTPC Block for Time Synchronization

R_NTPC Representation

The R_NTPC block reads Ethernet network system time and transfers it into specified parameters. The additional parameter EN should be configured.



The R_NTPC block has a 16-bit status word.

R_NTPC Output Parameters

Parameter	Data Type	Description
Display_NTPC (OUT1)	DT + INT	NTP clock value displayed as: year, month, day, minute, second in the DT format. Milliseconds are displayed as INTs.
Calc_NTPC (OUT2)	UDINT+INT	NTP clock values are displayed in: ● seconds as an UDINT ● fractions of a second as an INT
STATUS	INT	The low byte is managed by the CPU. When the low byte is set to 0: ● the clock value is not available ● the date and time are not updated within last two minutes When the low byte is set to 1: ● the date and time are updated within the last two minutes ● the date and time are acceptable
		The high byte is managed by the ETY. When the high byte is set to 0, the clock value transferred to CPU is not acceptable. When the high byte is set to 1, the updated date/time received from server and sent to module is: ● within two minute time interval ● acceptable (10 ms or less error)
	For a valid time in CPU, the low byte and the high byte of the STATUS parameter must be set to 1.	

Electronic Mail Notification Service

C

At a Glance

Overview

The electronic mail notification service uses the simple mail transport protocol (SMTP) to enable a controllerís project to send e-mail messages.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Introducing the Electronic Mail Notification Service	334
Using the Electronic Mail Notification Service	335
Using the SEND_REQ Block for Electronic Mail Notification	336
Electronic Mail Notification Service Error Codes	338

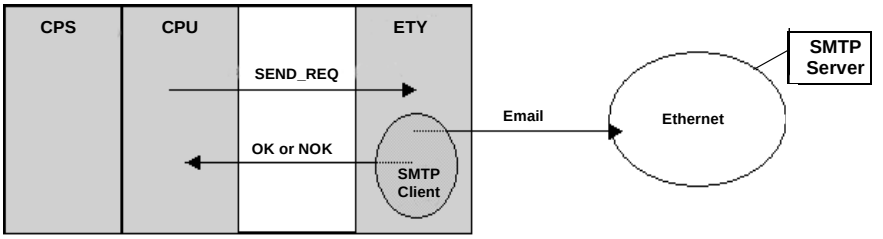
Introducing the Electronic Mail Notification Service

Introduction

The electronic mail notification service allows controller-based projects to report alarms or events. The controller monitors the system and dynamically creates an electronic mail message to alert local or remote users.

Mail Service Client

The TSX P57 ETY 4103 and -5103 and the TSX P57 x634 modules include an SMTP client. When the module receives a specific request from the project, the module sends an email message to the mail server.



Mail System Types

SMTP provides two mechanisms for the transmission of email messagesó direct connection and a relay system:

Mechanism	Condition	Result
Direct connection	sender and receiver are connected to the same transport service	Email messages are sent to host
Relay system	sender and receiver are connected to different transport services	Email messages are relayed from one server to another. The SMTP server must be supplied with the address of both the destination host and the destination mailbox.

Operating Modes and Sending Requests

Because the project sends the email request, a controller cannot send an email message either while in the stopped mode or while downloading a project. As soon as the controller is in run mode, the function block sends a request during the first project scan.
Diagnostic counters are reset to 0 after either a power-up, a project download, or a reconfiguration of the electronic mail notification service.

Using the Electronic Mail Notification Service

Configuring the Service

An authorized administrator may use the SMTP configuration web page to
- configure the electronic mail notification service
- set the IP address of the mail server

Note: The default TCP port number for SMTP is 25. Ensure that you configure the port specified by your local mail server (see ***p. 234***).

Message Creation and Delivery

A user-defined event or condition triggers the SEND_REQ block to create a message (see ***p. 336***). Each message uses one of three user-defined headers. Each message sent from the controller can contain text and variable information (up to a maximum of 238 bytes).
The project selects the appropriate header. Each header contains
- sender name
- list of recipients
- subject

Header Examples

An authorized administrator can define and update the text and variable information via an embedded SMTP Configuration web page. Define mail headers to indicate different levels of importance. For example,
- header 1 could be ***Urgent problem reported by PLC 10***
- header 2 could be ***Notification from substation 10***
- header 3 could be ***Info message from water system***

Listing different recipients in each of the three headers assures that information flows quickly to the right recipients. The project adds pertinent information such as the specific device, process or location. This information is added to the body of the mail message. Then the complete message is sent to an electronic mail server for distribution to recipients.
Recipients may be engineers, managers or process owners.

Security (Authentication)

An optional login (system ID) and password can be used to authenticate the connection to the SMTP mail server. The SMTP-supported authentication method is LOGIN.

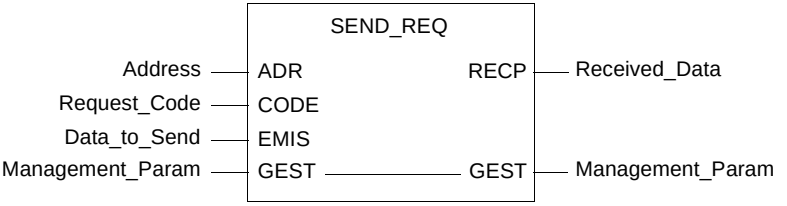
System Diagnostics

The SMTP diagnostic web page displays the status of the service. Diagnostic information is also available for remote management using the SNMP network management standard.

Using the SEND_REQ Block for Electronic Mail Notification

SEND_REQ Representation

To send an email message from the application, use a SEND_REQ block.



ADR

The ADR must use the following address format:
{***network.station***}***rack.module.channel***.SYS
For example, if an ETY module has the Xway address {10.1} and resides in slot 4 in the rack, its ADR would be:
`{10.1}0.4.0.SYS`

Note: An ADR of `{0.254}.0.4.0.SYS` also works, where `{0.254}` represents ***my address***.

For the TSX P57 5634 or -4634, use the ADR `{0.254}0.0.3.SYS`.
The ADR may be used to convert from the string format to the INT array expected by the block.

CODE

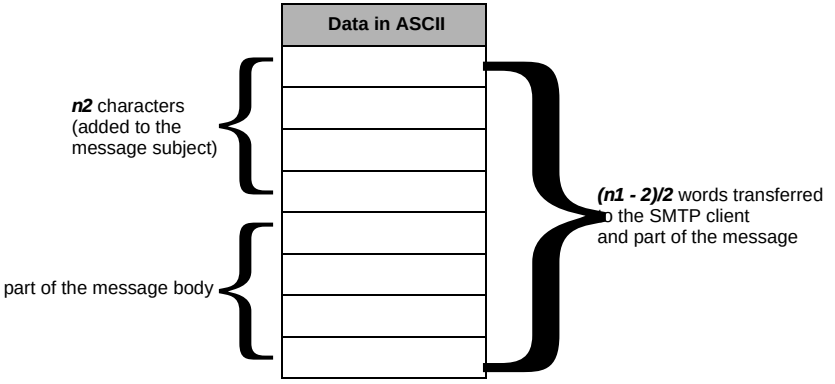
Use the write object request function code (0***x***37) for a SEND_REQ block. The expected success code is 0***x***FE, and the error code is 0***x***FD.

EMIS

The Data_to_Send contains the address of the buffer with the data to put in the body of the email. This information is preceded by a header with the following information:

Header Information	Value	Byte	Register
Segment	0***x***96	1	1
Type	0***x***15	2	
Address	N/A	3	2
		4	
Number (***n1***) of characters in the email	0	5	3
	≤ 240	6	
Mail header	{1, 2, 3}	7	4
	≤ (***n1*** - 2)	8	

The following (***n1*** - 2)/2 words (up to a maximum of 119)) contain the data in ASCII format that will be copied into the email message. The first ***n2*** characters are added to the configured email subject and the rest are part of the email body:


Data in ASCII
n2 characters (added to the message subject)
part of the message body
(n1 - 2)/2 words transferred to the SMTP client and part of the message

GEST

The fourth parameter of the management table must contain the size of the data buffer and must be set before you use the SEND_REQ block.

RECP

The Received_Data request does not return any data.

Electronic Mail Notification Service Error Codes

Error Codes

The following error codes are available only on the diagnostic website for the electronic mail notification service:

Error Code (hex)	Description
5100	Internal error
5101	SMTP component not operational
5102	Mail header not configured
5103	Invalid mail header value (should be 1, 2 or 3)
5104	Cannot connect to SMTP server
5105	Error in transmitting content of email body to SMTP server
5106	Closing SMTP connection with the server returned an error
5107	SMTP HELO request failed
5108	SMTP MAIL request failedó SMTP server may require authentication
5109	SMTP RCPT request failed
510A	No recipient accepted by the SMTP server
510B	SMTP DATA request failed
510C	Send email request contains an invalid length
510D	Authentication failed
510E	A Reset component request was received while the connection was open

Errata Sheet

D

User Manual Errata Sheet

Summary

The following technical and typographical errors have been identified in this manual:

Location in the Manual	on Page ...	Original Content	is replaced with ...
throughout the manual		***TSX P57 5634***	***TSX P57 5634/-4634***
Section 4.7: Time Synchronization Service	102: Function Block Diagram	***NOE***	***ETY***
		Modicon Quantum System	***Premium System***
Section 4. 8: Electronic Mail Notification Service	103: Function Block Diagram	***NOE***	***ETY***
Section 4.9.1: Embedded HTTP Server	105, second paragraph	***JDK 1.1.4***	***JRE 1.4.2_04 or higher***
Section 4.9: Global Data Page	118: Global Data web page diagram	***Active Links on Web Page: Home | Ethernet Module***	***Active Links on Web Page: Home | Ethernet Module Configuration | Ethernet Module Diagnostics***
Section 4.9: I/O Scanner Page	119: I/O Scanning Diagnostic web page diagram	***Active Links on Web Page: Home | Ethernet Module***	***Active Links on Web Page: Home | Ethernet Module Configuration | Ethernet Module Diagnostics***
Section 4.9: Messaging Page	120: Messaging Diagnostics web page diagram	***Active Links on Web Page: Home | Ethernet Module***	***Active Links on Web Page: Home | Ethernet Module Configuration | Ethernet Module Diagnostics***
Section 4.9: Bandwidth Monitoring Page	121: Bandwidth Monitoring web page diagram	***Active Links on Web Page: Home | Ethernet Module***	***Active Links on Web Page: Home | Ethernet Module Configuration | Ethernet Module Diagnostics***

Location in the Manual	on Page ...	Original Content	is replaced with ...
Section 4.9: Bandwidth Monitoring Page	121: first sentence	***TSX ETY 4103/ PORT/5013 module***	***TSX ETY 4103/PORT/5103 module***
Section 5.2.2: Configuring the General Parameters for the IO Scanning Utility	138: second bulleted list	***The length of tables has a maximum exchange capacity of:*** ● ***2 Kwords for the read zone*** ● ***2 Kwords for the write zone***	***The length of tables has a maximum exchange capacity of:*** ● ***2 Kwords for the read zone (ETY4103/ETY5103/ETY PORT)*** ● ***4 Kwords for the read zone (TSX P57 4634 and TSX P57 5634)*** ● ***2 Kwords for the write zone (ETY4103/ETY5103/ETY PORT***) ● ***4 Kwords for the write zone (TSX P57 4634 and TSX P57 5634)***
Section 8.2.4: IO Scanning Utility Configuration	226: Step 3 IO Scanning tab diagram	***IO dialog outdated***	***Updated screen capture unavailable at press time. Contact Schneider Electric for updated documentation***
Section 8.2.6: Configuring Global Data	231: second table, step 4	***from 50 to 1000 ms***	***from 50 to 15000 ms in 50 ms increments***
Section 9.2.4: IO Scanning Utility Configuration	278: step 3 Diagram of IO Scanning tab		***Updated screen capture unavailable at press time. Contact Schneider Electric for updated documentation.***

Location in the Manual	on Page ...	Original Content	is replaced with ...
Section 9.1.1: General	259: first bulleted list	***The Ethernet communication channel built into the processors concerns the following references:*** ● ***TSX P 57 264*** ● ***TSX P 57 284*** ● ***TSX P 57 364*** ● ***TSX P 57 484*** ● ***TSX P57 5634*** ***The characteristics of the Ethernet channel of the first four processors (called TSX ETY PORT in the previous sections) are the same as those of the Ethernet channel of the module TSX ETY 4103***	***The Ethernet communication channel built into the processors concerns the following references:*** ● ***TSX P57 1634 M (ETY PORT)*** ● ***TSX P57 2634 M (ETY PORT)*** ● ***TSX P57 3634 M (ETY PORT)*** ● ***TSX P57 4634 M (Copro Premium)*** ● ***TSX P57 5634 M (Copro Premium)*** ***The characteristics of the Ethernet channel of the first three processors (called TSX ETY PORT in the previous sections) are the same as those of the Ethernet channel of the module TSX ETY 4103***

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